

MATERIA MEDICA

A MANUAL
FOR STUDENTS

ISAMBARD OWEN

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MATERIA MEDICA

A MANUAL

FOR THE USE OF STUDENTS

BY

ISAMBARD OWEN, M.D., F.R.C.P.

ASSISTANT PHYSICIAN AND LECTURER ON MATERIA MEDICA AND THERAPEUTICS TO
ST. GEORGE'S HOSPITAL; LATE ASSISTANT PHYSICIAN TO THE BROMPTON
HOSPITAL FOR CONSUMPTION AND DISEASES OF THE CHEST.

SECOND EDITION

REVISED IN ACCORDANCE WITH THE BRITISH PHARMACOPŒIA OF 1885.



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PREFACE.

THIS little book has no pretensions to be considered an original or complete treatise on *Materia Medica*. It is simply intended to aid Students, by placing the outlines of the subject before them in such a manner that they may be clearly grasped, and readily committed to memory. It is to be regarded rather as a supplement to, than as a substitute for, the systematic works.

I have great pleasure in thanking Dr. Frederick J. Hicks, of the Brompton Hospital, for his material assistance in revising the sheets of Section III.; and Mr. A. F. Damon, of St. George's Hospital, for much valuable information on Pharmaceutical points.

The whole work has now been carefully revised in accordance with the British Pharmacopœia of 1885, and Section III. has been entirely re-written, with a slight modification of its plan.

A chapter on the "Medicinal Uses" of the Pharmacopœial drugs has been added, to meet the requirements of the Examining Boards that include this subject in the scope of their primary examinations in *Materia Medica*.

5, HERTFORD STREET, MAYFAIR, W.,

May, 1886.

TABLE OF CONTENTS.

	PAGE
THE PHARMACOPŒIA	1
The Drugs	1
The Preparations	4
The Weights and Measures	13
SECTION I.—DRUGS FURNISHED DIRECTLY BY THE ANIMAL KINGDOM.	14
First Group	14
Second Group	15
Third Group	16
SECTION II.—DRUGS FURNISHED DIRECTLY BY THE VEGETABLE	
KINGDOM	18
First Group:—Fungi and Lichens	19
Second „ Plants entire	20
Third „ Green Tops. Twigs	20
Fourth „ Flowering Tops. Strobile	21
Fifth „ Flowers	22
Sixth „ Buds	23
Seventh „ Woods	24
Eighth „ Barks	25
Ninth „ Leaves	27
Tenth „ Roots and Rhizomes	30
Eleventh „ Fruits. Glands from Fruit	35
Twelfth „ Seeds. Gossypium	40
Thirteenth „ Fixed Oils	43
Fourteenth „ Volatile Oils	45
Fifteenth „ Resins	49
Sixteenth „ Oleo-Resins	51
Seventeenth „ Balsams	52
Eighteenth „ Gums	53

SECTION II.—*continued.*

PAGE

Nineteenth Group :—Gum-Resins 54

Twentieth „ Concrete Juices. Galls 56

Twenty-first „ Active Principles of definite chemical composition—

A. Carbohydrates 61

B. Stearoptenes 62

C. Acids 63

D. Glucoside 63

E. Neutral Principles 64

F. Alkaloids and Alkaloidal Salts 64

Extraction of Alkaloids 69

Botanical Synopsis of the Natural Orders and Plants furnishing

Official Drugs 74

SECTION III.—MINERALS AND PRODUCTS OF MANUFACTURE .. 89

First Group :—Non-metallic Elements and their Compounds .. 90

Second „ Mineral Acids 94

Third „ Alcohols and their Derivatives 98

Fourth „ Organic Acids and Tar-products 105

Fifth „ Miscellanea 111

Sixth „ Metals and Metallic Compounds 113

Potassium Compounds 114

Sodium Compounds 119

Ammonium Compounds 125

Iron Compounds 128

Mercurial Compounds 133

Calcium Compounds 137

Zinc Compounds 140

Lead Compounds 143

Bismuth Compounds 146

Antimonial Compounds 148

Arsenical Compounds 150

Magnesium Compounds 152

Alum 154

Lithium Compounds 155

Silver Compounds 156

SECTION III.—*continued.*

	PAGE
Copper Compounds	157
Cerium Compounds	157
Manganese	157
SYNOPSIS OF THE COMPOUND PREPARATIONS OF THE PHARMACOPŒIA, AND THEIR INGREDIENTS	158
POPULAR DESIGNATIONS FOR PHARMACOPŒIAL PREPARATIONS ..	170
PHRASES USED IN PRESCRIBING	172
SYNOPSIS OF DOSES.. .. .	173
PROPORTION OF ACTIVE INGREDIENTS IN THE PHARMACOPŒIAL PREPARATIONS	184
INCOMPATIBILITY	192
THE MEDICINAL USES OF THE PHARMACOPŒIAL DRUGS—	
Inorganic Drugs	193
Organic Drugs	205
INDEX	216

ERRATUM.

P. 27, line 4. For "*of Cinchona*," read "*of Cinchona Rubra*."

MATERIA MEDICA.

THE PHARMACOPŒIA.

THE BRITISH PHARMACOPŒIA of 1885 defines 446 drugs, and prescribes 478 preparations, under Latin and English names.*

It prescribes the mode of production of a large number of the manufactured articles included among the drugs.

It specifies the physical properties and the chemical tests by which the drugs may be recognised and their purity certified.

It lays down tables of weights and measures.

It authorises a scale of doses for all the drugs and preparations intended for internal administration.

THE DRUGS.

Of the 446 drugs 18 are furnished directly by the animal kingdom, and 226 by the vegetable kingdom, of nature. The remaining 202 are native minerals and products of industrial or chemical manufacture.

The following thirty-four of the drugs are not themselves used in medicine, but are defined in the Pharmacopœia as being the source of other drugs, or as required for some of the processes prescribed :—

(Minerals and Manufactured Products.)

Natural Water . . .	or	<i>Aqua.</i>
Chalk (<i>unpurified</i>) . . .	„	<i>Creta.</i>
Marble (source of Carbonic Acid) . . .	„	<i>Marmor Album.</i>
Iron	„	<i>Ferrum.</i>
Copper	„	<i>Cuprum.</i>
Bismuth	„	<i>Bismuthum.</i>
Purified Bismuth	„	<i>Bism. Purificatum.</i>
Zinc	„	<i>Zincum.</i>
Granulated Zinc	„	<i>Zincum Granulatum.</i>
Purified Silver	„	<i>Argentum Purificatum.</i>
Sodium	„	<i>Sodium.</i>
Black Oxide of Manganese	„	<i>Manganesii Oxidum Nigrum.</i>
Black Antimony	„	<i>Antimonium Nigrum Purificatum.</i>

* Drugs and preparations contained in the Pharmacopœia are termed “*Officinal*” or “*Official*.”

Nitrate of Ammonium . . .	or	<i>Ammonii Nitrās.</i>
Nitrate of Sodium . . .	„	<i>Sodii Nitrās.</i>
Nitrate of Lead . . .	„	<i>Plumbi Nitrās.</i>
Sulphate of Calcium . . .	„	<i>Calcii Sulphas.</i>
Sulphate of Mercury . . .	„	<i>Mercurii Sulphas.</i>
Bichromate of Potassium . . .	„	<i>Potassii Bichromas.</i>
Ferrocyanide of Potassium . . .	„	<i>Potassii Ferrocyanidum.</i>
Bone-Black* . . .	„	<i>Carbo Animalis.</i>
Bone-Ash . . .	„	<i>Os Ustum.</i>
Absolute Alcohol . . .	„	<i>Alcohol Ethylicum.</i>
Amylic Alcohol (<i>Fusel Oil</i>) . . .	„	<i>Alcohol Amylicum.</i>
Oleic Acid . . .	„	<i>Acidum Oleicum.</i>
Meconic Acid . . .	„	<i>Acidum Meconicum.</i>

(Vegetables.)

Bebeeru Bark (source of Sulphate of Beberine)	or	<i>Nectandra Cortex.</i>
Cevadilla (source of Veratrine) . . .	„	<i>Sabadilla.</i>
Podophyllum Root (source of Podophyllin) . . .	„	<i>Podophylli Rhizoma.</i>
Scammony Root (source of Scammony Resin) . . .	„	<i>Scammonie Radix.</i>
Squirting Cucumber (source of Elaterium) . . .	„	<i>Ecballii Fructus.</i>
Star Anise . . .	„	<i>Anisi Stellati Fructus.</i>
“Worm Seed” (source of Santonin) . . .	„	<i>Santonica.</i>

(Animal Products.)

Unclarified Honey . . .	or	<i>Mel.</i>
-------------------------	----	-------------

The following thirty-two are used merely as vehicles :—

(Animal Kingdom.)

Milk . . .	or	<i>Lac.</i>
Clarified Honey . . .	„	<i>Mel Depuratum.</i>
Sugar of Milk . . .	„	<i>Saccharum Lactis.</i>
Lard . . .	„	<i>Adeps Preparatus.</i>
Clarified Mutton Suet . . .	„	<i>Sevum Preparatum.</i>
Bees Wax . . .	„	<i>Cera Flava.</i>
White Wax . . .	„	<i>Cera Alba.</i>

(Vegetable Kingdom.)

Wheat Flour . . .	or	<i>Farina Tritici.</i>
Linseed Meal . . .	„	<i>Lini Farina.</i>
Starch . . .	„	<i>Amylum.</i>
Loaf Sugar . . .	„	<i>Saccharum Purificatum.</i>
Gum Arabic . . .	„	<i>Acacie Gummi.</i>
Tragacanth . . .	„	<i>Tragacantha.</i>
Almond Oil . . .	„	<i>Oleum Amygdalæ.</i>
Olive Oil . . .	„	<i>Oleum Olivæ.</i>
Hips . . .	„	<i>Rosæ Caninæ Fructus.</i>
Cocoa Butter . . .	„	<i>Oleum Theobromæ.</i>
Canada Balsam . . .	„	<i>Terebinthina Canadensis.</i>
Gutta Percha . . .	„	<i>Gutta Percha.</i>

(Minerals and Manufactured Products.)

Distilled Water . . .	or	<i>Aqua Destillata.</i>
Proof Spirit . . .	„	<i>Spiritus Tenuior.</i>
Rectified Spirit . . .	„	<i>Spiritus Rectificatus.</i>
Sherry . . .	„	<i>Vinum Xericum.</i>
Orange Wine . . .	„	<i>Vinum Aurantii.</i>
Glycerine . . .	„	<i>Glycerinum.</i>

* Animal Charcoal (*Carb. An. Purificatus*) is used, but mainly as a pharmaceutical (filtering) agent.

Acetic Acid*	.	.	.	or	<i>Acidum Aceticum.</i>
Treacle	.	.	.	„	<i>Theriaca.</i>
Bread Crumb	.	.	.	„	<i>Mica Panis.</i>
Soft Soap	.	.	.	„	<i>Sapo Mollis.</i>
Curd Soap	.	.	.	„	<i>Sapo Animalis.</i>
Paraffin	.	.	.	„	<i>Paraffinum Durum.</i>
Vaseline	.	.	.	„	<i>Paraffinum Molle.</i>

Rosin, and Castile Soap (*Resina*, and *Sapo Durus*) are used mainly, but not exclusively, as vehicles.

The following four are colouring agents:—

Cochineal	.	.	.	or	<i>Coccus.</i>
Red Sandal Wood	.	.	.	„	<i>Pterocarpus Lignum.</i>
Red Poppy	.	.	.	„	<i>Papaver Rhæas.</i>
Saffron	.	.	.	„	<i>Crocus.</i>

Red-rose petals (*Rosa Gallica*) are used chiefly as a colouring agent, but possess astringent properties also.

The following eight are merely flavouring agents:—

Orange-flower Water	.	.	.	or	<i>Aqua Aurantii Floris.</i>
Cabbage-Rose	.	.	.	„	<i>Rosa Centifolia.</i>
Elder flowers	.	.	.	„	<i>Sambuci Flores.</i>
Raisins	.	.	.	„	<i>Uvæ.</i>
Mulberry Juice	.	.	.	„	<i>Mori Succus.</i>
Jordan Almond	.	.	.	„	<i>Amygdala Dulcis.</i>
Liquorice Root	.	.	.	„	<i>Glycyrrhizæ Radix.</i>
Hemidesmus Root	.	.	.	„	<i>Hemidesmi Radix.</i>

The following twenty-three may also be classed as flavouring agents, though the first possesses bitter, the rest stimulant and carminative properties, which make them therapeutically useful as vehicles:—

Bitter Orange Peel, fresh	.	.	.	or	<i>Aurantii Fructus.</i>
„ „ dried	.	.	.	„	<i>Aurantii Cortex.</i>
Lemon Peel	.	.	.	„	<i>Limonis Cortex.</i>
Caraway	.	.	.	„	<i>Carui Fructus.</i>
Cardamoms	.	.	.	„	<i>Cardamomum.</i>
Cinnamon	.	.	.	„	<i>Cinnamomi Cortex.</i>
Coriander	.	.	.	„	<i>Coriandri Fructus.</i>
Cloves	.	.	.	„	<i>Caryophyllum.</i>
Dill	.	.	.	„	<i>Anethi Fructus.</i>
Nutmeg	.	.	.	„	<i>Myristica.</i>
Pimento	.	.	.	„	<i>Pimenta.</i>

And the Essential Oils of

Caraway	.	.	.	or	<i>Ol. Carui.</i>
Cinnamon	.	.	.	„	<i>„ Cinnamomi.</i>
Cloves	.	.	.	„	<i>„ Caryophylli.</i>
Coriander	.	.	.	„	<i>„ Coriandri.</i>
Dill	.	.	.	„	<i>„ Anethi.</i>
Lavender	.	.	.	„	<i>„ Lavandulæ.</i>
Lemon	.	.	.	„	<i>„ Limonis.</i>
Nutmeg	.	.	.	„	<i>„ Myristicæ.</i>
Peppermint	.	.	.	„	<i>„ Menthæ Piperitæ.</i>
Pimento	.	.	.	„	<i>„ Pimentæ.</i>
Rosemary	.	.	.	„	<i>„ Rosmarini.</i>
Spearmint	.	.	.	„	<i>„ Menthæ Viridis.</i>

The remaining 345 drugs are reputed to possess more or less active medicinal properties.

* Glacial Acetic Acid, and Dilute Acetic Acid, are used medicinally.

THE PREPARATIONS.

The preparations prescribed by the Pharmacopœia are of thirty-five different kinds.

Extracts (*Extracta*) consist either of the expressed juices of fresh vegetables, clarified and concentrated ; or of the soluble ingredients of dry drugs, separated by macerating or percolating them in various menstrua, and evaporating the strained solution to the desired consistence.

A. The Extracts of Aconite, Belladonna leaves,* Hemlock, Henbane, and Lettuce are prepared from fresh plants as follows :—

1. The fresh juice, obtained by bruising in a mortar,
Heated to 130° F.
A coagulum of green colouring matter separates, is strained off, and put aside.
2. The strained juice,
Heated to 200° F.
A coagulum of albumen separates.
3. The juice filtered from albumen,
Evaporated to a thin syrup ;
The green colouring matter returned ;
Evaporated at 140° F. to a consistence "suitable for forming pills."

These are termed "Green Extracts."

B. The Extracts of Colchicum and Taraxacum, from fresh drugs as follows :—

1. The fresh juice, obtained by crushing and expressing,
Decanted from deposit ;
Heated to 212° F.
A coagulum of albumen separates.
2. The filtered liquid,
Evaporated at 160° F. to a similar consistence.

The Acetic Extract of Colchicum is prepared in a similar way, but Acetic Acid is added to the crushed corms before expressing the juice, and evaporation is not carried so far.

C. In making the extracts of dry drugs, the menstrua used in different cases are the following :—

Cold Water.
Water at 160° (*Extr. Sarsæ Liq.*).
Boiling water.
Water acidulated with Hydrochloric Acid, and containing Glycerine (*Extr. Cinchon. Liq.*).

Proof Spirit.
Rectified Spirit.
Ether (*Extr. Filicis Liq.*, *Extr. Mezerei Æthereum*).

In some cases the drug is exhausted by the use of two of these menstrua in succession.

Extr. Mezerei Æthereum is an ethereal extract of a spirituous extract of Mezereon.

Stramony is cleared of its oil by ether before making the extract.

* There is also an Extract of Belladonna root, termed *Extr. Belladonnæ Alcoholicum*.

In making the Extract of Poppy, the gummy matters in the solution are precipitated by Rectified Spirit before evaporation.

Extract of Chamomile has the essential oil of Chamomile added to it.

The Extract of Colocynth is a "Compound Extract"; having other drugs added it during evaporation.

The solutions thus obtained are evaporated to various degrees of consistence, as follows:—

1. The Extracts of Rhatany, Logwood, and Aloes are evaporated to complete dryness.
2. The "*Liquid Extracts*," of which there are thirteen, are evaporated only so far as to produce a concentrated solution.

Extr. Cinchonæ Liq. is required to contain 5 p.c. of Alkaloids.

Extr. Pareiræ Liq. and *Extr. Opii Liq.* are simply solutions of *Extr. Pareiræ* and *Extr. Opii* in diluted spirit.

Extr. Filicis Liq. is nothing more than the fixed oil of the plant, extracted, as above stated, by means of Ether, which is subsequently all distilled off.

3. The remaining Extracts are evaporated to a consistence "suitable for forming pills," except those of Calabar bean, Mezereon, and Indian Hemp, which are left in a softer state, and the Extract of Nux Vomica, which is evaporated until it contains just 15 p.c. of alkaloids.

The term *Extr. Belladonnæ Alcoholicum* is used to distinguish Extract of Belladonna root from *Extr. Belladonnæ*, made from the leaves. The Extract of Gelsemium is also termed *Extr. Gelsemii Alcoholicum*, for no apparent reason.

A purified soft extract made from *Extr. Ergotæ Liquidum* (Benjean's Ergotine) is introduced into the Pharmacopœia under the name of *Ergotinum*.

Including *Ergotinum*, the Pharmacopœia prescribes forty-eight Extracts altogether: thirteen being "Liquid Extracts."

Juices (*Succi*)* are the expressed juices of fresh vegetables preserved by the addition of one-third of their volume of Rectified Spirit, and strained after standing for a week.

The Pharmacopœia prescribes five, of

Belladonna, Hemlock, Henbane, Dandelion, and Broom.

Essences (*Essentiæ*) are solutions of essential (volatile) oils in four times their volume of Rectified Spirit.

The Pharmacopœia prescribes two only, of

Anise and Peppermint.

* Mulberry and Lemon juices (*Mori Succus*, *Limonis Succus*) are natural drugs, and not preparations. The prepared Juices are termed, "*Succus Belladonnæ*, *Succus Conii*," etc.

Infusions (*Infusa*) are extractive solutions of such ingredients of vegetables as are soluble in water, made by pouring boiling water on the broken-up drug, macerating for periods varying from a quarter of an hour to two hours, and straining clear. The Pharmacopœia prescribes twenty-eight.

The infusions of Cusparia and Chiretta are made with water at 120° F. only.

The infusions of Quassia and Calumba with cold water, so as not to dissolve out the starch that these drugs contain.

Infusion of Koussou is administered unstrained.

Inf. Rosæ Acidum is made with boiling water acidulated with $1\frac{1}{4}$ p.c. of Sulphuric Acid.

Decoctions (*Decocta*) are similar preparations, made by boiling the drugs in water for periods varying from five to twenty minutes, and straining clear. Some are ordered to be strained *while hot*, as part of their active ingredients is deposited on cooling.

The Pharmacopœia prescribes thirteen.

In preparing Decoction of Pomegranate Root, the liquid is boiled down to half its original bulk.

Tinctures (*Tincturæ*).

The Tinctures of Quinine, Iodine, Iron Salts, and Chloroform are simple solutions in spirit. The Tincture of Indian Hemp is a solution of the extract in spirit.

Tr. Chloroformi et Morphinæ contains only an eighth part of Rectified Spirit, the menstruum being chiefly composed of Syrup.

The rest of the Pharmacopœial Tinctures are extractive solutions prepared by macerating animal or vegetable drugs in spirit, in some cases for two days, in others for seven, and straining or percolating.

It is to these extractive Tinctures, which are generally deeply tinged by the colouring matters of the drug, that the name of *Tincture* properly applies.

The Pharmacopœia prescribes seventy-two tinctures altogether.

Proof Spirit is the menstruum used for most of the Tinctures.

The stronger Rectified Spirit is used in preparing the Tinctures of

Aconite, Arnica, Asafoetida,	Lavender, Larch,
Benzoin, Cubebs,	Myrrh, Nux Vomica,
Capsicum, Cinnamon,	Pellitory, Sumbul, Tolu,
Hellebore, Kino,	Fresh Orange Peel, and
Iodine, Indian Hemp,	Ginger.

Diluted Spirits for the Tinctures of Iron Salts (Acetate and Perchloride).

A mixture of Rectified Spirit and *Tr. Cardam. Co.* for *Tr. Chloroformi Co.*
Tincture of Orange Peel for *Tr. Quininæ*.

Spirit of Ether for *Tr. Lobeliæ Æthereæ*.

Sal. Volatile for *Tr. Guaiaci Ammoniata* and *Tr. Valerianæ Ammoniata*.

A mixture of Rectified Spirit with one-fourth of *Liq. Amm. Fortior* for *Tr. Opii Ammoniata*.

Proof Spirit for *Tr. Quininæ Ammoniata*, *Liq. Ammoniacæ* being added subsequently

Wines (*Vina*) are similar preparations made with white wines. The Pharmacopœia prescribes nine,

Sherry (*Vin. Xericum*) is prescribed for all but *Vinum Quininæ* and *Vinum Ferri Citratis*, which are made with Orange Wine (*Vin. Aurantii*).

Spirits (*Spiritus*) are solutions of colourless substances in Rectified Spirit. The Pharmacopœial *Spirits* (fifteen in number) are solutions of volatile oils (two being ammoniated), of Camphor, Chloroform, Ether, Nitrous Ether, and "Ethereal Oil" (*Sp. Ætheris Co.*).

Sp. Armoraciæ Co., *Sp. Amm. Aromaticus*, and *Sp. Amm. Fœtidus* are prepared by distillation.

The preparation of *Sp. Ætheris Nitrosi* and *Sp. Ætheris Co.* is detailed in Section III.

The rest are prepared by direct solution, in the following proportions:—
Oils, 1 in 50; Chloroform, 1 in 20; Camphor, 1 in 10; Ether, 1 in 3.

Spiritus Rectificatus (Rectified Spirit), *Sp. Tenuior* (Proof Spirit), and *Sp. Vini Gallici* (French Brandy) are not *preparations*. (See "Alcohol.")

Vinegars (*Aceta*) are extractive solutions in Acetic Acid, prepared by maceration and straining.

The Pharmacopœia prescribes two only.

In making *Acetum Cantharidis*, a mixture of the glacial with the ordinary acid is used.

For *Acetum Scillæ*, the Dilute Acid.

Solutions (*Liquores*) are properly watery solutions of definite chemical compounds. The menstruum of the Pharmacopœial *Solutions* is not in all cases pure water. (See under "Alkaloids," "Iodine," and "Metallic Compounds.")

The solutions of the Alkaloids (except *Liq. Morphine Bimeconatis*) and the three Arsenical Solutions are all made to a strength of 1 p.c., i.e., of $4\frac{1}{3}$ gr. in the fluid oz.

The Pharmacopœia prescribes fifty-one solutions, including the five following, and the effervescing solutions.

"*Liq. Epispasticus*" is an extractive solution prepared from Cantharides with Acetic Ether.

"*Liq. Gutta-Percha*" is a solution of Gutta-Percha in Chloroform.

Collodion is a solution of Gun-Cotton (*Pyroxylin*) in Ether and Rectified Spirit.

"Flexile Collodion," the same; with Castor Oil and Canada Balsam added.

"Blistering Collodion" (*Collodium Vesicans*) is a solution of Gun-Cotton in *Liq. Epispasticus*.

The "Effervescing Solutions" (*Liq. Effervescentes*) are weak solutions of the Bicarbonates of Potassium and Sodium, and of Carbonate of Lithium, charged with Carbonic Acid under a pressure of four atmospheres, and corked down,—in short, the "Potash," "Soda," and "Lithia," waters of ordinary use. *Liq. Magnesii Carbonatis* and *Liq. Magn. Citratis* also contain Carbonic Acid, developed under pressure, and require to be kept corked.

Waters (*Aquæ*) consist of water saturated with essential oils or similar fragrant substances sparingly soluble. The Pharmacopœia prescribes fourteen.

Essential oils are extracted by distilling the vegetable products containing them with water. From the milky fluid which condenses in the receiver the oil separates, leaving a clear "*distilled water*," which retains the minute portion of the oil it is capable of dissolving. The Pharmacopœia prescribes processes for distilling these *waters* from vegetable drugs or essential oils, but they are practically procured as above.

Aqua Camphoræ and *Aqua Chloroformi* are prepared by simply shaking the two drugs up with water.

Aq. Laurocerasi contains Prussic Acid, which is its only active ingredient. As distilled from the leaves of the Cherry-laurel it is of very varying strength. The Pharmacopœia directs it to be strengthened or diluted till it contains '1 p.c. of the acid: *i.e.*, one-twentieth the strength of *Ac. Hydrocyanicum Dil.*

Syrups (*Syrupi*). The Pharmacopœial Syrups are prepared by adding large proportions of sugar or syrup to

The fresh juices of *Lemon* and *Mulberry* fruit;

Solutions of *Chloral*, of *Phosphate*, and of *Iodide*, of *Iron*;

Specially made infusions of *Hemidesmus*, *Poppy*, *Red Poppy*, *Red Rose*, and *Senna*;

A special decoction of *Tolu*;

A special tincture of *Rhubarb*;

The officinal Tincture of *Orange Peel* and the strong Tincture of *Ginger*;

The officinal Vinegar of *Squill*;

The officinal *Orange Flower Water*.

To some a little spirit is added for preservation.

Simple Syrup (*Syrupus*) is prepared by dissolving sugar in half its weight of water, the product giving 6 parts of sugar in 7.

Mucilages (*Mucilagines*) are solutions of colloid substances in water.

The Pharmacopœia prescribes three, of

Gum-arabic, Starch, and Tragacanth.

Glycerines (*Glycerina*) are solutions in glycerine, pure or diluted.

The Pharmacopœia prescribes six such solutions; *viz.*, of

Tannic, Gallic, and Carbolic Acids, and of Subacetate of Lead; made by dissolving 1 part in 4, making $4\frac{1}{2}$.

Alum; made by dissolving 1 part in 5, making $5\frac{1}{2}$.

Borax; made by dissolving 1 part in 6, making $6\frac{1}{2}$.

Also two translucent jellies, *viz.* :—

Glyc. Amyli, made by heating 1 part of Starch with 5 of Glycerine and 3 of water.

Glyc. Tragacanthæ, made by rubbing 3 parts of Tragacanth with 12 of Glycerine and 2 of water.

Oils (*Olea*) are solutions in fixed oils. The Pharmacopœia prescribes one only, *Oleum Phosphoratum*;—Almond Oil saturated with Phosphorus, containing about 1 p.c.

Honey (*Mel*).

Mel Boracis is a solution of Borax in 8 parts of Clarified Honey, with a little Glycerine. Oxymel is a mixture of Clarified Honey with an eighth part of Acetic Acid and the same of water.

Oxymel Scillæ is a mixture of Clarified Honey with Vinegar of Squill, evaporated to a thick consistency.

Dilute Acids (*Acida Diluta*) are Acids diluted with water to a strength convenient for dispensing. The Pharmacopœia prescribes

<i>Ac. Sulphuricum Dil.</i> , containing	8½ p.c. of the " <i>Acidum</i> ."
<i>Ac. Aceticum Dil.</i>	13 " " "
<i>Ac. Phosphoricum Dil.</i> }	15 " " "
<i>Ac. Lacticum Dil.</i> }	" " "
<i>Ac. Nitricum Dil.</i>	20 " " "
<i>Ac. Hydrochloricum Dil.</i>	30 " " "
<i>Ac. Hydrocyanicum Dil.</i>	2 " Prussic Acid, HCN.
<i>Ac. Hydrobromicum Dil.</i>	10 " Hydrobromic Acid, HBr.

(The last two are prescribed in the Pharmacopœia in the diluted form only.)

Also:—*Ac. Sulphuricum Aromaticum*,—7 p.c. of the "*Acidum*" in Rectified Spirit, flavoured with Cinnamon and Ginger.

And:—*Ac. Nitrohydrochloricum Dil.*; a mixture of 3 parts of Nitric Acid, with 4 of Hydrochloric Acid, and 25 of water; containing, besides free acids, Chlorine and Nitrosyl Chloride, NOCl.

Oleates (*Oleata*). Greasy mixtures of true oleates with oleic acid, prepared by dissolving metallic oxides in oleic acid.

The Pharmacopœia prescribes two: viz., of Zinc and of Mercury (made with the yellow oxide). The proportion of oxide to acid used is in both cases 1 to 9.

The above preparations, it will be noted, simply place the drugs in a convenient form for dispensing. They are for the most part simple, containing but a single drug, or its active part, besides the vehicle. Some are directed to be flavoured and coloured with various ingredients; and a few are compound preparations (see the "Synopsis" later in the book), i.e., they contain the active principles of more than one drug.

The following are forms of preparations ready for internal or external administration without further dispensing. Many are compound (see the "Synopsis").

(For internal use.)

Compound Powders (*Pulveres Compositæ*) are intimate admixtures of dry drugs, finely powdered. The Pharmacopœia prescribes sixteen.

Confections or Electuaries (*Confectiones*) are similar mixtures of dry or pulpy drugs, brought to the consistence of a soft extract with sugar, syrup, or honey. The Pharmacopœia prescribes eight.

Pill-masses (*Pilulæ*) are composed of extracts or other tenacious substances, or are directed to be made up with Castile soap, treacle, syrup, glycerine, confection of roses, or of hips, bees-wax, or castor oil. Phosphorus pill-mass is made with Tolu, bees-wax, and curd soap.

Some are scented with particular essential oils, as a means of distinguishing them apart.

The Pharmacopœia prescribes twenty-one.

The Pharmacopœia gives no directions for rolling these masses into pills. As usually rolled, each pill is made by 5 grains of the pill-mass. The more active pills, *Pil. Hydrargyri*, *Pil. Phosphori*, *Pil. Plumbi c. Opio*, *Pil. Saponis Co.*, are rolled in various sizes.

Lozenges (*Trochisci*). The Pharmacopœial lozenges are small tablets, made up with sugar and gum. They are twelve in number; of

Bismuth.	Santonin.
Reduced Iron.	Catechu.
Potassium Chlorate.	Opium.
Sodium Bicarbonate.	Morphine.
Tannic Acid.	Morphine and Ipecacuanha.
Benzoic Acid.	Ipecacuanha.

Tablets (*Tabellæ*). The Pharmacopœia prescribes *Tabellæ Nitroglycerini*, tablets of chocolate $2\frac{1}{2}$ grains in weight, each containing $\frac{1}{100}$ grain of Nitro-glycerine.

Mixtures* (*Misturæ*). Under this title, the Pharmacopœia prescribes modes of suspending or emulsifying certain drugs insoluble in water; also a preparation of Epsom Salts and Senna, and an aromatic bitter infusion, which is made to take up a minute quantity of iron; ten "mixtures" altogether. (See the "Synopsis of Compound Preparations.")

Inhalations (*Vapores*). The Pharmacopœia prescribes methods of disengaging for inhalation.

Prussic Acid,—by mixing 10 to 15 min. of *Ac. Hydrocyan. Dil.*, with a drachm of water;

Chlorine,—by moistening 2 oz. of Chlorinated Lime with cold water.

And of volatilising for the same purpose

Creasote, by mixing 12 min. with 8 oz. of boiling water in an "inhaler" which allows air to be drawn through the fluid;

Fir-wood Oil, by rubbing 40 min. with a scruple of light Carbonate of Magnesium and an ounce of water; and using a drachm of the mixture, with half a pint of cold, and the same of boiling water, in a similar apparatus;

Iodine, by mixing a drachm of *Tr. Iodi* with an ounce of water, and heating gently;

Conine, by mixing half an ounce of Hemlock Juice with a drachm of *Liq. Potassæ* and an ounce of water, and placing 20 min. of the mixture on a sponge in an "inhaler" which allows the vapour from hot water to be drawn over it.

* Draughts (*Haustus*) are single doses of mixtures.

Enemas or Clysters (*Enemata*). The Pharmacopœia prescribes methods of preparing for administration *per rectum*.

Opium, by mixing $\frac{1}{2}$ drm. of *Tr. Opii* with 2 oz. of Mucilage of Starch,—*Enema Opii*.

And the following purgative Clysters :—

Enema Asafetidæ.—30 grains rubbed into an emulsion with 4 oz. of water.

Enema Aloës.—40 grains rubbed together with half a pint of Mucilage of Starch and 15 grains of Potassic Carbonate.

Enema Terebinthinæ.—An ounce of *Ol. Terebinth.*, mixed with three-fourths of a pint of Mucilage of Starch.

Enema Magnesii Sulphatis.—An ounce of Epsom Salts dissolved in three-fourths of a pint of Mucilage of Starch, and an ounce of Olive Oil added.

Suppositories (*Suppositoria*) are small cones of greasy matters with an intimate admixture of active drugs, for administration *per rectum*. The Pharmacopœia prescribes five made with cocoa-butter, viz. :—

Supp. Morphinæ,—Hydrargyri,—Acidi Tannici,—Iodoformi,—Plumbi Co. (Opium and Acetate of Lead) ;

And three made with Curd Soap and Glycerine of Starch, viz. :—

Supp. Ac. Carbolici cum Sapone,—Morphinæ c. S.,—Ac. Tannici c. S.

Hypodermic Injections (*Injectiones Hypodermicæ*) are strong solutions in plain water, without spirit or appreciable amounts of free acid, for injection into the areolar tissue under the skin. The Pharmacopœia prescribes three—of Morphine, Apomorphine, and Ergotine, containing in each minim respectively $\frac{1}{10}$ gr., $\frac{1}{50}$ gr., $\frac{1}{3}$ min.

(For external application.)

Lotions (*Lotiones*) are solutions or suspensions of drugs in water or spirit, for continuous external application. The Pharmacopœia prescribes but two, *Lotio Hydrargyri Nigra*, and *Lotio Hydr. Flava*, containing Mercurous and Mercuric Oxide respectively, suspended in water.

Liniments (*Linimenta*) are either strong tinctures, which can be *painted* on the skin and allowed to dry; or mixtures containing oily matters, which enables them to be *rubbed into* a part. The Pharmacopœia prescribes sixteen altogether. (See “Synopsis of Compound Preparations.”)

Ointments (*Unguenta*) are admixtures of active drugs with greasy matters, preserving a soft but solid consistence, for smearing over or rubbing into the skin. The Pharmacopœia prescribes forty-five, including “*Adeps Benzoatus*” (*Benzoated Lard*). (See “Synopsis of Compound Preparations.”)

Unguentum Simplex is a mixture of white wax, lard, and almond oil, without any active drug.

Adeps Benzoatus is clarified lard, heated with Benzoin, of which it takes up about 7 gr. to the ounce.

Poultices (*Cataplasmata*). The Pharmacopœia prescribes methods of making

Linseed Poultice (*Cat. Lini*) by mixing 4 oz. of Linseed Meal gradually with half a pint of boiling water, constantly stirring;

Hemlock Poultice (*Cat. Conii*), by adding to the above an ounce of Hemlock Juice, previously evaporated down to half its bulk;

Mustard Poultice (*Cat. Sinapis*), by mixing $2\frac{1}{2}$ oz. of Linseed Meal with 6 or 8 oz. of boiling water, and adding $2\frac{1}{2}$ oz. of mustard mixed with 2 or 3 oz. of lukewarm water;

Chlorine Poultice (*Cat. Sodæ Chlorinatæ*), by mixing 4 oz. of Linseed Meal with 8 oz. of boiling water, and adding 2 fl. oz. of *Liq. Sod. Chlorinatæ*;

Charcoal Poultice (*Cat. Carbonis*), by macerating 2 oz. of bread-crumbs for 10 minutes in half a pint of boiling water, stirring in $1\frac{1}{2}$ oz. of linseed meal, then $\frac{1}{4}$ oz. of wood charcoal, and sprinkling a second $\frac{1}{4}$ oz. of charcoal on the surface;

Yeast Poultice (*Cat. Fermenti*), by mixing 6 oz. of Yeast with the same amount of water at 100° F., stirring in 14 oz. of wheat flour, and setting the mass near a fire till it "rises."

Plasters (*Emplastra*). The Pharmacopœial plasters (fourteen in number) are all made with resins, wax, Castile soap, or lead-soap, which when gently warmed, soften and become adhesive to the skin. *Emplastrum Plumbi* consists entirely of lead-soap, and is used for adhesive purposes simply; the others contain an admixture of more or less active drugs. (See "Synopsis of Compound Preparations.")

The Pharmacopœia gives no directions for *spreading* the plasters. When required for use, they are softened by heat, and evenly spread on thin leather or on any suitable tissue.

Papers (*Chartæ*). *Charta Epispastica* (blistering-paper) is made by coating cartridge paper with a Cantharides plaster, made with white wax, spermaceti, olive oil, and a little rosin and Canada Balsam.

Charta Sinapis (mustard leaf) is cartridge paper coated with mustard by the aid of gutta-percha solution. It requires to be immersed in warm water (see "*Sinapis*," p. 41) for use.

Discs (*Lamellæ*). Minute gelatine discs, weighing about $\frac{1}{50}$ gr., containing a dose of an active drug, intended for local application to the conjunctiva, by being placed within the lower eyelid. The Pharmacopœia prescribes three: of

Atropine, each containing $\frac{1}{5000}$ gr. (of *Atropinæ Sulphas*).

Physostigmine, each containing $\frac{1}{1000}$ gr.

Cocaine, each containing $\frac{1}{200}$ gr. (of *Cocainæ Hydrochloras*).

The nature of the "distilled," "purified," "clarified," "granulated," and "dehydrated" drugs, is explained in the body of the work as each occurs.

The Pharmacopœia does not prescribe any of the following:—

Gargles (*Gargarismata*). Mixtures which it is customary to thicken with syrup, gum, or glycerine, for application to the fauces and pharynx.

Eye-washes (*Collyria*). Lotions which should be free from acid or caustic alkali, much spirit, or other irritating substances.

Linctuses (*Linctus*). Mixtures of syrupy, oily, or mucilaginous matters, sometimes medicated with active drugs, intended to be taken in small doses to allay irritation about the throat and larynx.

Medicated Pessaries (*Pessus*). Preparations analogous to suppositories, for local application of drugs to the vaginal mucous membrane.

Urethral Suppositories. Similar preparations made in the form of bougies for application to the urethra.

Chloroforms (*Chloroforma*). Tinctures made with Chloroform instead of spirit, intended for use in liniments.

Tablets. Single doses of alkaline or metallic salts, moulded by means of strong pressure into concrete masses that are easily swallowed.

Lamels (*Lamellæ*), made by rolling out a thin sheet of gelatine with an intimate mixture of active drugs, and dividing it into little squares, each of which contains a single dose of the drug. They may be swallowed as they are, or dissolved in water.

Discs (*Disci*). Similar preparations, but of smaller size, containing a single dose of an alkaloid for hypodermic injection. To be dissolved in water when required.

Capsules (*Capsulæ*). Single doses of drugs which possess nauseous flavours, enclosed in capsules of gelatin, to be swallowed whole.

THE WEIGHTS AND MEASURES.

WEIGHTS.

		1 grain.
437½ grains	=	1 ounce.
16 ounces, or 7,000 grains	=	1 pound.

MEASURES.

		1 minim.
60 minims	=	1 fluid drachm.
8 fluid drachms	=	1 fluid ounce.
20 fluid ounces	=	1 pint.
8 pints	=	1 gallon.

The grain in the above system is adopted from the "Troy" scale; the ounce from the "avoirdupois" or Imperial standard. The pint and gallon are the Imperial measures.

1 minim is the measure of	0.91 grains of water.
1 fluid drachm	54.68 "
1 fluid ounce	437.5 " or 1 ounce of water.
1 pint	8750.0 " or 1½ pound "
1 gallon	70000.0 " or 10 pounds "

In the Metrical System:—

1 gramme	=	15.432 grains.
1 litre	=	1 pint, 15 oz., 2 drms., 11 min.

A litre is the measure of a thousand grammes (1 kilo.) of water.

A millilitre (its thousandth part) is therefore the measure of 1 gramme of water, and is equivalent to 16.93, or practically 17, minims.

A cubic centimetre is equivalent to a millilitre.

SYMBOLS.

The following are customary:—

Gr. (granum), ℥ (minimum), ʒ (drachma), ʒ (uncia), lb. (librum), O (Octarius—pint).

ʒ (scrupulum) and ʒ (drachma) are legally used in prescribing solids to denote 20 grains and 60 grains respectively.

SECTION I.

DRUGS FURNISHED DIRECTLY BY THE ANIMAL
KINGDOM. 18 OFFICINAL.

DIVIDED INTO THREE GROUPS.

FIRST GROUP.

The following nine well-known substances are introduced into the Pharmacopœia, all but the last being used simply as vehicles.

Lac. Fresh cows' milk.

Mel. Honey.

Mel Depuratum. Clarified Honey, *i.e.*, Honey melted over a water bath and strained through flannel.

Adeps Præparatus. Lard, similarly treated.

Sevum Præparatum. Clarified Mutton Suet.

Cera Flava. Bees-wax (yellow).

Cera Alba. White-wax, *i.e.*, Bees-wax bleached by exposure to moisture, air, and light.

Ovi Albumen. The Whites of Fowls' Eggs.

Ovi Vitellus. The Yolks „ „

Lard melts at about 100° F.

Mutton-suet „ 103° „

Bees-wax „ 140° „

White-wax „ 150° „

Suet is soluble in boiling Rectified Spirit.

Lard „ Ether, and Oil of Turpentine.

White-wax „ Oil of Turpentine.

Bees-wax „ „ leaving about a fourth undissolved.

Neither form of wax yields anything to cold Rectified Spirit.

OFFICINAL PREPARATIONS.

Oxymel. Clarified Honey, with an eighth part of *Ac. Aceticum* and the same amount of water.

Adeps Benzoatus. Clarified Lard heated with Benzoin, of which it takes up about 7 grains to the ounce.

Unguentum Simplex. A mixture of White-wax, Lard, and Almond Oil.

Mistura Spiritus Vini Gallici:—The yolks of two Eggs, mixed with 4 oz. of Brandy, the same amount of *Aq. Cinnamomi*, and $\frac{1}{2}$ oz. of sugar.

Ovi Vitellus is introduced only to make the last-named preparation. *Lac* only for *Mistura Scammonii*. *Mel Depuratum* furnishes *Oxymel*, *Oxymel Scillæ*, and *Mel Boracis*, and is used in making *Confections*. *Lard*, *Suet*, and *Wax* are used in preparing *Ointments*, *Plasters*, *Suppositories*, and *Papers*. No pharmaceutical use for white of egg is suggested in the *Pharmacopœia*.

SECOND GROUP:—ONE LIVING ANIMAL.

Hirudo. The Leech. Two species are defined, *Sanguisuga Medicinalis* (Speckled Leech) and *S. Officinalis* (Green Leech).

Both are wrinkled transversely and have olive-green backs with six rusty-red longitudinal stripes. The belly in the latter is olive-green also; in the former it is greenish-yellow, with black spots.

Leeches are collected in France, Spain, Italy, and Hungary. They are preserved in pans of fresh soft water.

The Leech attaches itself to the skin by muscular sucking-discs, one at each extremity. On the anterior, or smaller, of the two opens the mouth, which is tri-radiate and surrounded by three cartilaginous jaws, each armed with a double row of minute teeth, by means of which the animal saws into the skin.

On an average a Leech draws $1\frac{1}{2}$ drachm of blood; at most 4 drachms. When satiated it usually drops off spontaneously.

Bleeding is generally encouraged afterwards by fomentations. The amount of afterflow varies greatly, according to the region and the individual; but averages $1\frac{1}{2}$ drachm if encouraged.

If not watched, it may, in some cases, go on indefinitely.

THIRD GROUP:—EIGHT DRUGS.

The first is merely a colouring agent for tinctures; the last is chiefly used as a vehicle. The remainder possess more or less valuable medicinal properties. Cantharis, Pepsin, and Cod-liver Oil are important drugs.

Coccus. *Cochineal.* The female Cochineal Insect, *Coccus Cacti*, killed and dried. Mexico and Teneriffe.

Contains *Carmine*.

If collected during pregnancy, coated with a white "bloom," forming *Silver Cochineal*.

Cantharis. *Cantharides.* The Spanish Fly, *Cantharis Vesicatoria*, killed and dried. Hungary.

About 4 p.c. of *Cantharidin*, $C_5H_{12}O_2$, the active principle.

Cantharidin is soluble in Chloroform, Ether, and strong Acetic Acid, not in water or alcohol.

It sublimes unchanged.

Moschus. *Musk.* The secretion of the preputial follicles of the Musk-deer, *Moschus Moschiferus*, dried. Central Asia.

Contains a volatile oil.

Fel Bovinum Purificatum. *Ox-gall.* An extract made with Rectified Spirit from fresh Ox-bile.

Contains all the ingredients of the bile but the mucus.

Soluble in water.

Pepsin. The contents of the gastric glands of a pig, sheep, or calf, mixed with some epithelium, dried and powdered. Obtained by scraping the inner surface of the stomach (after washing) with a blunt knife, drying the scrapings at a low temperature, and powdering.

Insoluble in water or spirit.

Contains *Pepsin*, the active principle of the Gastric Juice.

The properties of Pepsin are destroyed by a heat over 120° F.

Cetaceum. *Spermaceti.* Nearly pure *Cetin*, $C_{32}H_{64}O_2$, with a little oily matter, separated from the oil contained in a cavity in the head of the Sperm-whale, *Physeter Macrocephalus*. Pacific and Indian Oceans.

Crystalline.

Fuses at 112° F.

Soluble in fixed oils.

Oleum Morrhue. *Cod-liver Oil.* Oil extracted from the fresh liver of the Cod (*Gadus Morrhua*) at a heat not exceeding 180° F. North Sea.

Pale yellow.

If prepared at higher temperatures, or from livers that have been kept, it has a brown tint, deeper according to the degree of temperature and the staleness of the livers. The pale yellow is the only officinal oil, and is generally preferred in medicine.

Contains 70 p.c. of *Olein*, 25 p.c. of *Margarin*, some biliary principles, and traces of Iodine.

Other species of *Gadus* yield the same oil, but in less amount.

Saccharum Lactis. *Milk Sugar.* On evaporating whey, the sugar separates and crystallizes on pieces of cord or wood placed in the fluid.

Hard crystals of pure *Lactose*, $C_{12}H_{24}O_{12}$.
Soluble in 7 parts of water, not in Rectified Spirit.

OFFICINAL PREPARATIONS.

Tinctura Cocci.

Contains Carmine.

Tinctura Cantharidis. Strength, 1 in 80.

Acetum Cantharidis. An extractive solution in Acetic Acid strengthened by addition of the Glacial Acid, made at a temperature of 200° F. 1 in 10.

Liquor Epispasticus. *Blistering Fluid.* An extractive solution of Cantharides in Acetic Ether. 1 in 4.

Collodium Vesicans. The above, with 5 p.c. of Gun-cotton dissolved in it.

Emplastrum Cantharidis. 1 in 3.

Emplastrum Calefaciens. 1 of Cantharides in 25.

Charta Epispastica. *Blistering Paper.* Paper coated with a plaster of Cantharides. 1 in 9.

Unguentum Cantharidis. 1 in 7.

Unguentum Cetacei.

The bases of the various Ointments, Plasters, etc., will be found in the "Synopsis of Compound Preparations."

Milk Sugar is little used, except as a vehicle for Powders, as in the officinal Pulvis Elaterini Co. (p. 64).

SECTION II.

DRUGS FURNISHED DIRECTLY BY THE VEGETABLE
KINGDOM. 226 OFFICINAL.

First	Group . . .	Fungi and Lichens, 3.
Second	„ . . .	Plants Entire, 3.
Third	„ . . .	Green Tops, 2; Twigs, 1.
Fourth	„ . . .	Flowering Tops, 2; Strobile, 1.
Fifth	„ . . .	Flowers, 7.
Sixth	„ . . .	Buds, 2.
Seventh	„ . . .	Woods, 4.
Eighth	„ . . .	Barks, 13.
Ninth	„ . . .	Leaves, 14.
Tenth	„ . . .	Roots and Rhizomes, 27; Corm., 1; Bulb, 1; Tubers, 1.
Eleventh	„ . . .	Fruits, 28; Glands from Fruit, 2.
Twelfth	„ . . .	Seeds, 16; Gossypium.
Thirteenth	„ . . .	Fixed Oils, 7.
Fourteenth	„ . . .	Volatile Oils, 25.
Fifteenth	„ . . .	Resins, 7.
Sixteenth	„ . . .	Oleo-Resins, 5.
Seventeenth	„ . . .	Balsams, 4.
Eighteenth	„ . . .	Gums, 2.
Nineteenth	„ . . .	Gum-Resins, 6.
Twentieth	„ . . .	Concrete Juices, 9; Excrescence, 1.
Twenty-first	„ . . .	Active Principles of Definite Composition (Carbohydrates, Stearoptenes, Acids, Neutral Principles, Alkaloids), 32.

The Officinal Preparations are described at the end of each group.

Botanical Synopsis of the Natural Orders and Plants furnishing the Officinal
Drugs, with their Geographical Sources and Preparations.

FIRST GROUP:—FUNGI AND LICHENS. 3.

Ergot is the only important drug in this group.

Ergota. *Ergot of Rye.* Native.

The compact mycelium (sclerotium) forming a stage in the life-history of the fungus, *Claviceps Purpurea*.

The fungus is parasitic on the ovary of *Secale Cereale* (common rye).

The sclerotium grows from beneath the ovary, and replaces the grain within the pales.

Contains 10 p.c. of **Ergotinum** (see below), a brown bitter extract of doubtful composition, and 35 p.c. of a fixed oil.

Cerevisiæ Fermentum. *Yeast.* Native.

Consists almost entirely of round or oval cells, forming the fungus *Saccharomyces Cerevisiæ*. During the fermentation of malt infusion they multiply actively, being the immediate cause of the conversion of sugar into alcohol.

Cetraria. *Iceland Moss.* *Cetraria Islandica*, a lichen, forming a foliaceous thallus.

Contains 80 p.c. of starchy matters, and a bitter principle, *Cetraric Acid*, only slightly soluble in water.

OFFICIAL PREPARATIONS.

Extractum Ergotæ Liquidum.

Contains the ergotine, but no oil. 1 fl. oz. corresponds to 1 oz. of Ergot. The preparation ordinarily used.

Ergotinum. *Bonjean's Ergotine.* A further extract made from the above.

Soluble in water and alcohol. Used hypodermically.

Infusum Ergotæ.

One-fortieth the strength of the Liquid Extract.

Tinctura Ergotæ.

One-fourth the strength of the Liquid Extract.

Injectio Ergotini Hypodermica. *Ergotinum* dissolved in Camphor water, 1 part in 2.**Decoctum Cetrariæ.**

A pint corresponds to an ounce of the moss. Contains the starches, but not much of the bitter.

Cataplasma Fermenti.

Made with 14 oz. of flour, and six fluid ounces of yeast mixed with the same of water at 100° F. Placed near a fire to "rise."

SECOND GROUP:—PLANTS ENTIRE. 3.

Lobelia is the only important drug in this group.

Chirata. *Chiretta* (*Ophelia Chirata*. Ord. Gentianaceæ). *India*.

Stems, roots, small flowers and capsules.

Contains a bitter principle, soluble in water and alcohol.

Lactuca. *Wild Lettuce* (*Lactuca Virosa*. Ord. Compositæ). *Native*.

Collected while flowering.

Contains *Lactucin*, a crystalline principle 'resembling Mannite, soluble in water.

Lobelia. *Indian Tobacco* (*Lobelia Inflata*. Ord. Lobeliaceæ). *United States*.

Stem, root, leaves, flowers and capsules.

Contains a liquid alkaloid, *Lobeline*.

OFFICINAL PREPARATIONS.

Extractum Lactucæ. A green extract (p. 4.)

Infusum Chiratæ.

Tinctura Chiratæ.

Tinctura Lobeliæ.

Tinctura Lobeliæ Ætherea (p. 6). } Same strength.

THIRD GROUP:—GREEN TOPS, 2. TWIGS, 1.

Sabina. *Savin Tops*. From *Juniperus Sabina* (Coniferæ). *Native*.

Young branches enveloped in imbricated leaves, dried.

Contains **Oleum Sabinæ** (see p. 48), Gallic Acid, and a resin.

Scoparium. *Broom Tops*. From *Cytisus Scoparius* (Leguminosæ). *Native*.

Young branches, green and dried.

Contains *Scoparin*, a neutral principle, and *Sparteine*, a volatile bitter liquid alkaloid, both soluble in water and alcohol.

OFFICINAL PREPARATIONS.

Succus Scoparii.

Tinctura Sabinæ.

Decoctum Scoparii.

Unguentum Sabinæ.

FOURTH GROUP:—FLOWERING TOPS, 2. STROBILE, 1.

The first two are important.

Cannabis Indica. *Indian Hemp, Bhang, Gunjah, Hashish.* From *Cannabis Sativa* (Cannabinaceæ). *India.*

Twigs, leaves, remains of flowers, and a few ripe fruits, compressed.

The plant is ordinary Hemp, grown in India. Grown in Europe, it has not the same medicinal properties. The Indian is alone official.

Contains a resin, *Cannabin*, soluble in Rectified Spirit, not in water; and a little volatile oil. The former is the active principle.

Cusso. *Kousso.* From *Hagenia Abyssinica* (Rosaceæ). *Abyssinia.*

Twigs, flowers, and unripe fruits.

Contains a volatile oil, an acrid resin, Tannic Acid, and *Koussin*, a crystallizable principle soluble in water.

OFFICINAL PREPARATIONS.

Extractum Cannabis Indicæ. Contains the resin.

Tinctura Cannabis Indicæ. A solution of the extract in Rectified spirit, $2\frac{3}{4}$ gr. in the drachm.

The resin is precipitated on dilution with water.

Infusum Cusso. Unstrained, containing the powdered drug suspended.

(STROBILE.)

Lupulus. *Hop.* From *Humulus Lupulus* (Cannabinaceæ). *Native.*

Bracts and achenes, and minute glands (amounting to about a sixth of the whole) which form **Lupulinum** (p. 38).

The bracts contain Tannic Acid.

OFFICINAL PREPARATIONS.

Extractum Lupuli.

Infusum Lupuli.

Tinctura Lupuli.

FIFTH GROUP:—FLOWERS. 7.

Chamomile is the only drug of any importance in this group. Red-rose is used medicinally in the Acid Infusion. The remainder are colouring and flavouring agents.

Anthemis. *Chamomile.* From *Anthemis Nobilis* (Compositæ). *Native.*
Both single and double flower-heads.

Contains **Oleum Anthemidis** (see p. 47), and a bitter principle. The former is chiefly in the disk, therefore most abundant in the "single" flowers.

Aqua Aurantii Floris. *Orange-flower Water.* From *Citrus Aurantium* and *C. Vulgaris*, *Sweet and bitter Orange* (Aurantiaceæ).
Distilled in France.

Contains a volatile oil, and some free Acetic Acid.

Crocus. *Saffron.* From *Crocus Sativus* (Iridaceæ). *S. Europe.*
The stigmata, with part of the styles, only.

Contains orange-red colouring matter, *Polycroite*, soluble in water and alcohol.

Rhæas. *Red Poppy.* From *Papaver Rhæas* (Papaveraceæ). *Native.*
The petals.

Contains a red colouring matter, soluble in water and alcohol.

Rosa Centifolia. *Cabbage Rose.* From *Rosa Centifolia* (Rosaceæ). *Native.*
The petals, fresh.

Contains a volatile oil, "*Attar of Roses*," soluble in alcohol, slightly in water.

Rosa Gallica. *Red Rose.* From *Rosa Gallica*. *Native.*
The petals.

Contains Tannic and Gallic Acids, red colouring matter, a trace of volatile oil.

Sambucus. *Elder Flower.* From *Sambucus Nigra* (Caprifoliaceæ). *Native.*
The fresh flowers.

Contains a volatile oil.

OFFICINAL PREPARATIONS.

Extractum Anthemidis. Strengthened with Ol. Anthemidis.

Aqua Aurantii Floris.

Aqua Rosæ (from Rosa Centifolia). Colourless.

Aqua Sambuci.

Infusum Anthemidis.

Infusum Rosæ Acidum. Made from Rosa Gallica, with 6 min. of Ac. Sulphuricum Dil. in the ounce.

Tinctura Croci. Orange red.

Syrupus Aurantii Floris. Aq. Aur. Flor. sweetened.

Syrupus Rosæ Gallicæ. Red.

Syrupus Rhæados. Red.

Confectio Rosæ Gallicæ.

SIXTH GROUP:—BUDS. 2.

Santonica is the source of Santonin. Clove is little more than a flavouring agent.

Caryophyllum. *Clove.* From *Eugenia Caryophyllata* (Myrtaceæ). *E. Indian Islands.*

Contains **Oleum Caryophylli** (see p. 46).

Santonica. *Worm Seed.* From *Artemisia Maritima*, var. *Stechmanniana* (Compositæ). *Russia.*
Unexpanded flower-heads.

Contains *Santonin* (**Santoninum**, see p. 64), and a volatile oil.

OFFICINAL PREPARATION.

Infusum Caryophylli.

SEVENTH GROUP:—WOODS. 4.

Sandal Wood is merely a colouring agent. The others are important.

Guaiacum. *Lignum Vitæ.* From *Guaiacum Officinale* or *G. Sanctum* (Zygophyllaceæ). *W. Indies.*

The heart-wood only.

Contains a resin (**Guaiaci Resina**, see p. 49).

Hæmatoxylon. *Logwood.* From *Hæm. Campechianum* (Leguminosæ). *E. & W. Indies.*

Contains a red crystalline colouring matter, *Hæmatoxylin*, soluble in alcohol, slightly in water: and Tannic Acid.

Pterocarpus. *Red Sandal Wood.* From *Pterocarpus Santalinus* (Leguminosæ). *Ceylon, Coromandel.*

Contains a red crystalline colouring matter, *Santalin*, soluble in alcohol, alkaline solutions, and Acetic Acid, not in water; and Gallic Acid.

Quassia. From *Picræna Excelsa* (Simarubaceæ). *Jamaica.*

Contains a crystalline neutral bitter principle, *Quassin*. Some Starch.
No Tannin.

OFFICINAL PREPARATIONS.

Extractum Hæmatoxyli.

Extractum Quassiæ.

Infusum Quassiæ. Made with cold water, on account of the starch in the wood.

Tinctura Quassiæ.

Decoctum Hæmatoxyli. Flavoured with cinnamon.

Pterocarpus is used to colour Tr. Lavandulæ Co. There are no preparations of Guaiac Wood; of the Resin, a mixture and an ammoniated tincture (see p. 50). Guaiac Wood is used in preparing Dec. Sarsæ Co.

EIGHTH GROUP:—BARKS. 13.

The Cinchona Barks are of high importance. Canella is merely a flavouring agent. The rest are of minor importance.

Canella. From *Canella Alba* (Canellaceæ). *W. Indies.*

Contains a volatile oil and a bitter principle.

Cascarilla. From *Croton Eluteria* (Euphorbiaceæ). *Bahamas.*

Contains a volatile oil and a bitter principle.

Cinchona. *Cinchona Bark.* From *Cinch. Calisaya*, *Cinch. Officinalis*, *Cinch. Succirubra*, *Cinch. Lancifolia*, and other species of *Cinchona* (Rubiaceæ). *N. parts of S. America. India.*

Contains the alkaloids—*Quinine*, *Cinchonine*, *Quinidine*, *Cinchonidine*; *Quinic*, *Quinovic*, and *Quino-tannic Acids*.

The active principles, as found in the bark, are soluble in alcohol, and sparingly in water.

Quino-tannic Acid gives a green precipitate with Ferric Salts.

The following Alkaloidal Salts are officinal (see pp. 65-67).

Quininæ Hydrochloras.

Quininæ Sulphas.

Cinchoninæ Sulphas.

Cinchonidinæ Sulphas.

Quinine and Cinchonine are yielded also by some species of *Remijia*.

Cinchona Rubra. *Red Bark.* From cultivated plants of *Cinchona Succirubra*. *Chimborazo.*

Both quills and flat pieces.

The same active principles. The officinal Red Bark should yield $2\frac{1}{2}$ -3 p.c. of Quinine and Cinchonidine, and as much of other alkaloids.

Cinnamomum. *Cinnamon.* From *Cinnam. Zeylanicum* (Lauraceæ). *Ceylon.*

Contains **Oleum Cinnamomi** (see p. 46), and Tannic Acid.

Cusparia. *Angustura Bark.* From *Galipea Cusparia* (Rutaceæ). *S. America.*

Contains a volatile oil, and a bitter principle, *Angusturin*, soluble in alcohol, less so in water, precipitated by Tannic Acid.

Distinguished from *Nux Vomica* bark, the chief adulteration, by the blood-red colour the Brucine in the latter strikes with Nitric Acid.

Granati Radix. *Pomegranate Bark.* From *Punica Granatum* (Myrtaceæ). *Mediterranean Coast.*

The bark of the root.

Contains 20 p.c. of Tannic Acid.

Larix. *Larch Bark.* From *Pinus Larix* (Coniferæ). *Europe.*

Contains Tannic Acid and *Larixinic Acid*, crystalline and volatile, soluble in alcohol, sparingly in water.

Mezereon. From *Daphne Mezereum* and *D. Laureola* (Thymelaceæ). *Native.*

Contains an acrid resin and an acrid volatile oil, the former soluble in alcohol and ether.

Nectandra. *Bebeeru Bark.* From *Nectandra Rodiæi* (Lauraceæ). *Guiana.*

Contains about $2\frac{1}{2}$ p.c. of the alkaloid *Beberine*.

Beberinæ Sulphas is officinal (see p. 65).

Quercus. *Oak Bark.* From *Quercus Robur* (Cupuliferæ). *Native.*

From the small branches and young stems only.

Contains about 6 p.c. of Tannic Acid.

Rhamnus Frangula. From *Rhamnus Frangula*, *Black Alder* (Rhamnaceæ). *Native.*

From the young trunk and moderate-sized branches, kept a year before using.

A cathartic principle, *Frangulin*, has been isolated.

Rhamnus Purshianus. *Cascara Sagrada.* From *Rhamnus Purshianus* (Rhamnaceæ). *California.*

Contains several resins and a volatile oil.

OFFICIAL PREPARATIONS.

Extractum Cascaræ Sagradæ (*Rhamnus Purshianus*).

Extractum Cascaræ Sagradæ Liq.

Extractum Rhamni Frangulæ.

Extractum Rhamni Frangulæ Liq.

Extractum Mezerei Æthereum (see p. 4).

Pulvis Cinnamomi Co. Equal parts of Cinnamon, Cardamoms, and Ginger.

Aqua Cinnamomi.

Infusum Cascarillæ.

Infusum Cuspariæ. Made with water at 120° F., not to disperse the volatile oil.

Decoctum Granati Radicis (see p. 6).

Decoctum Quercus.

* * Decoctions of Pomegranate and Oak Bark are practically solutions of Tannic Acid.

Tinctura Cascarillæ.

Tinctura Cinnamomi.

Tinctura Laricis.

(Of *Cinchona*.)

Extractum Cinchonæ Liquidum. 1 fl. oz. corresponds to 1 oz. of the bark.

Infusum Cinchonæ Acidum. 27½ gr. to the oz., with 6 min. Aromatic Sulphuric Acid.

Decoctum Cinchonæ. 22 gr. to the oz.

Tinctura Cinchonæ. 88 gr. to the oz.

Tinctura Cinchonæ Co. 49 gr. of bark to the oz.; with Serpentry; flavoured with Orange peel, coloured with Saffron and Cochineal.

The barks defined under Cinchona are authorised as sources of the Cinchona alkaloids. Nectandra is used only as a source of Beberine. Canella Alba is used to flavour Vin. Rhei.

NINTH GROUP :—LEAVES. 14.

Nearly all highly important drugs.

Aconiti Folia. *Aconite Leaves.* From *Aconitum Napellus*, *Monkshood* (Ranunculaceæ). *Native.*

Contain the alkaloid **Aconitina** (p. 64), but in less amount than the root, **Aconiti Radix** (p. 30). It is combined with *Aconitic Acid*.

Belladonnæ Folia. *Belladonna Leaves.* From *Atropa Belladonna*, *Deadly Nightshade* (Solanaceæ). *Native.*

Contain the alkaloid **Atropina** (see p. 64), and some *Asparagine*.

Belladonnæ Radix is also officinal (see p. 30).

Buchu. *Bucco.* From *Barosma Betulina*, *Crenulata*, and *Serratifolia* (Rutaceæ). *Cape.*

Three kinds of leaf.

Contains a volatile oil, and a bitter principle soluble in water, not in alcohol.

Coca. From *Erythroxylon Coca*, *Cuca* (Erythroxylaceæ). *Peru.*

Contain a crystallizable alkaloid, *Cocaine*, and a volatile alkaloid, *Hygrine*, and a modification of Tannic acid. **Cocainæ Hydrochloras** is officinal (see p. 65).

Conii Folia. *Hemlock Leaves.* From *Conium Maculatum* (Umbelliferae). *Native.*

Contain the liquid volatile alkaloid *Conine* $C_8H_{15}N$, but in less amount than the fruit, **Conii Fructus** (see p. 38).

Conine is separated from its combination by adding Caustic Alkali to any part of the plant. It has an odour of mice. It is officinal only in the form of an Inhalation (see pages 10 and 29).

- Digitalis.** From *Digitalis Purpurea*, *Foxglove* (Scrophulariaceæ). *Native.*
Of the principles which have been isolated, three, the neutral principle, *Digitoxin*, and the glucosides, *Digitalin* and *Digitalein*, possess the specific action of the drug on the heart.
All are soluble in alcohol; the last only in water.
Various mixtures of these principles are sold under the name of "*Digitaline*."
- Hyoscyamus.** *Henbane.* From *Hyoscyamus Niger* (Solanaceæ). *Native.*
Contains a volatile liquid alkaloid *Hyoscyamine*, isomeric with *Atropine*.
- Jaborandi.** From *Pilocarpus Pennatifolius* (Rutaceæ). *S. America.*
The leaflets.
Contains an alkaloid, *Pilocarpine*.
Pilocarpinæ Nitras is officinal (see p. 66).
- Laurocerasus.** *Cherry Laurel.* From *Prunus Laurocerasus* (Rosaceæ). *Native.*
Contain the glucoside *Amygdalin*, which yields, on distillation, a volatile oil, and a small amount of *Prussic Acid*.
- Matica.** *Matico.* From *Piper Angustifolium* (Piperaceæ). *Peru.*
A thick down on the upper surface.
Contain a volatile oil, a bitter principle, *Artanthic Acid*, soluble in water and alcohol, and *Tannin*.
- Senna Alexandrina.** *Alexandrian Senna.* From *Cassia Acutifolia* (Leguminosæ). *Uncertain source.*
Two kinds of leaf.
Contain a yellowish-red glucoside, *Cathartin*, of bitter and nauseous taste, soluble in water and alcohol. Also a volatile oil of nauseous odour and taste.
Cathartin is precipitated by *Tannic Acid*.
- Senna Indica.** *Tinnevelly Senna.* From *Cassia Angustifolia*. *India.*
The same constituents.
- Tabacum.** *Tobacco.* From *Nicotiana Tabacum* (Solanaceæ). *Virginia, W. Indies, &c.*
Unmanufactured tobacco.
Contain a liquid alkaloid, *Nicotine*, $C_{10}H_{14}N_2$, of acrid odour and taste.
- Uva-Ursi.** *Bearberry.* From *Arctostaphylos Uva-Ursi* (Ericaceæ). *Europe.*
Contain about 36 p.c. of *Tannic Acid* and 1.5 p.c. of *Gallic Acid*, and a little volatile oil.

OFFICINAL PREPARATIONS.

- Extractum Aconiti** (p. 4).
Extractum Belladonnæ (p. 4).
Extractum Conii.
Extractum Hyoscyami.
Extractum Jaborandi.
Extractum Cocæ Liquidum.

Succus Belladonnæ.

Succus Conii.

Succus Hyoscyami.

Infusum Buchu.

Infusum Digitalis.

Infusum Jaborandi.

Infusum Maticæ.

Infusum Sennæ.

Infusum Uvæ-Ursi.

Tinctura Belladonnæ.

Tinctura Buchu.

Tinctura Digitalis.

Tinctura Hyoscyami.

Tinctura Jaborandi.

Tinctura Sennæ. Flavoured with Raisins, Caraway, and Coriander.

Syrupus Sennæ. Flavoured with Oil of Coriander.

Confectio Sennæ. With Coriander seed, Figs, Tamarinds, Cassia, Prunes, Extract of Liquorice, sugar and water.

Mistura Sennæ Co. A solution of Epsom Salts (*Magnesii Sulphas*) in Infusion of Senna, flavoured with Tincture of Senna, Extract of Liquorice, and *Tr. Cardam. Co.* $1\frac{1}{2}$ drachm of the salt in each fluid ounce.

Pil Conii Co. With Ipecacuanha and Treacle.

Cataplasma Conii. An ounce of Hemlock Juice, concentrated, in a poultice made with four ounces of Linseed (p. 12).

Vapor Coninæ. Half an ounce of Hemlock Juice, a drachm of Liq. Potassæ, and an ounce of water, mixed. Twenty minims to be placed on a sponge over hot water, and the steam inhaled.

Aqua Laurocerasi. Contains Prussic Acid. Brought up, or reduced, artificially to a strength of '1 p.c.

The strength of the preparations of Hemlock is very variable, as Conine is not only volatile, but is liable to decomposition in presence of air. Succus Conii is the most trustworthy. Tr. Conii, according to Dr. John Harley, is almost inert.

The remaining preparations of Aconite, the Tincture and Liniment, as well as the Alkaloid Aconitine, are prepared from the Root (see p. 33).

Belladonna Liniment and the Alkaloid Atropine are prepared from Belladonna Root (see p. 33).

Tincture of Hemlock is prepared from the fruit (see p. 39).

The three kinds of Senna leaves are used indifferently in the preparations.

TENTH GROUP:—ROOTS AND RHIZOMES. 27.

CORM, 1. BULB, 1. TUBERS, 1.

Liquorice and Hemidesmus are merely flavouring agents; Horse-radish, Arnica, Pellitory, Sassafras, Serpentary, and Sumbul are of small importance. The remainder are important drugs, and some of high importance.

Aconiti Radix. *Aconite Root.* From *Aconitum Napellus*, *Monkshood* (Ranunculaceæ). Root. *Native.*

Contains *Aconitina* (see p. 64), in greater amount than the leaves, *Aconiti Folia*. (p. 27).

Armoracia. *Horse-radish.* From *Cochlearia Armoracia* (Cruciferae). Root. *Native.*

Contains, or developes on being scraped, an acrid volatile oil, apparently identical with oil of mustard.

Arnica. From *Arnica Montana* (Compositæ). Rhizome and rootlets. *Europe.*

Contains a volatile oil, and an acrid resin soluble in alcohol.

Belladonnæ Radix. From *Atropa Belladonna*, *Deadly Nightshade* (Solanaceæ). Root. *Native.*

Contains *Atropina* (see p. 64), and another alkaloid *Belladonnine*. *Belladonnæ Folia* are officinal (see p. 27).

Calumba. From *Jateorhiza Calumba* (Menispermaceæ). Root. *E. Africa.*

Contains a bitter alkaloid, *Berberine*, and a neutral bitter principle, *Calumbin*, slightly soluble in water and alcohol. Also Starch.

Cimicifuga. From *Cimicifuga Racemosa*, *Black Snake Root* (Ranunculaceæ). *N. America.*

Rhizome and rootlets.

An active neutral principle, *Cimicifugin*, has been isolated, a volatile oil and a resin.

Colchicum. From *Colchicum Autumnale*, *Meadow Saffron* (Melanthaceæ). Corms, fresh and dried. *Native.*

Contains an alkaloid, *Colchicine*.

Colchici Semina are officinal (see p. 40).

Filix Mas. *Male Fern.* From *Aspidium Filix Mas* (Filices). Rhizome with rootlets and bases of petioles. *Native.*

Contains a fixed oil, a volatile oil, and a resin, all soluble in ether. The fixed oil forms *Extr. Filicis Liq.*

- Gelsemium.** From *Gelsemium Nitidum*, *Yellow Jasmine* (Loganiaceæ).
Southern States.
 Rhizome and rootlets.
 The active principle is an alkaloid, *Gelsemine*. *Gelseminic Acid* has been isolated.
- Gentiana.** *Gentian.* From *Gentiana Lutea* (Gentianaceæ). Root.
 European mountains.
 Contains a bitter principle, *Gentiopicroin*, soluble in water.
- Glycyrrhiza.** *Liquorice.* From *Glycyrrhiza Glabra* (Leguminosæ).
 Rhizome. *Native.*
 Contains a sweet glucoside, *Glycyrrhizin*, soluble in water and alcohol, precipitated by acids.
- Hemidesmus.** *Indian Sarsaparilla.* From *Hemidesmus Indicus* (Asclepiadaceæ). Root. *India.*
- Ipecacuanha.** From *Cephaelis Ipecacuanha* (Rubiaceæ). Root. *Brazil.*
 Contains an alkaloid, *Emetine*, and an astringent acid, *Cephaëlic Acid* which strikes green with Ferric Salts.
- Jalapa.** *Jalap.* From *Ipomoea Purga* (Convolvulaceæ). Tubers. *Mexico.*
 Contains 18 p.c. of **Resina Jalapæ** (see p. 49).
- Krameria.** *Rhatany.* From *Krameria Triandra* (*Peruvian Rhatany*), *Kr. Ixina* (*Savanilla Rh.*), and *Kr. Tomentosa* (Polygalaceæ). Root. *Peru, Chili.*
 Contains 20 p.c. of Tannic Acid, and a red astringent matter, soluble in water and alcohol.
- Parcira.** From *Chondrodendron Tomentosum* (Menispermaceæ). Root. *Brazil.*
 Contains a bitter alkaloid, *Felosine*, possibly identical with Beberine.
- Podophyllum.** From *Podoph. Peltatum* (Ranunculaceæ). Rhizome. *United States.*
 Contains **Podophylli Resina** (see p. 50).
- Pyrethrum.** *Pellitory.* From *Anacyclus Pyrethrum* (Compositæ). Root. *Morocco, Spain, Levant.*
 Contains acrid oil and resins, and some Tannic Acid.
- Rheum.** *Rhubarb.* From *Rh. Palmatum*, *Rh. Officinale*, and probably other species (Polygonaceæ). Root, deprived of its outer coat.
 Three kinds, *Russian* or "*Turkey*," *East Indian*, and *Dutch-Trimmed* or *Batavian*, all from China and Central Asia.
 Contains *Chrysophanic Acid* as yellow granules, sparingly soluble in cold water or alcohol, more so in hot, yielding red soluble chrysophanates with alkaline solutions, insoluble chrysophanates with lime-water, magnesia, and various metallic solutions; also a glucoside yielding *Chrysophanic Acid*.
 Several resins, soluble in alcohol, not in water. One, *Phaoretin*, is purgative.
 Rheotannic Acid and some bitter principle.
 Calcium Oxalate, in masses of acicular crystals (*raphides*):—35 p.c. in Russian Rhubarb.

Sarsa. *Jamaica Sarsaparilla.* From *Smilax Officinalis* (Smilacæ).
Roots, folded in bundles. *Central America.*

Contains a crystalline principle, *Smilacin*, soluble in alcohol, not in water.
No starch.*

Sassafras. From *Sassafras Officinale* (Lauracæ). Root. *N. America.*
Contains a volatile oil.

Scammonia Radix. *Scammony Root.* From *Convolvulus Scammonia* (Convolvulacæ). Root. *Asia Minor.*

Contains **Scammonia Resina** (see p. 50).

Scammonium, the gum-resin obtained from the root during life, is officinal (see p. 55).

Scilla. *Squill.* From *Urginea Scilla* (Liliacæ). Bulb, sliced. *S. Europe.*
The active principle is a glucoside, *Scillain*.

Senega. From *Polygala Senega* (Polygalacæ). Root-stock and roots.
United States.

Contains a glucoside, *Senegin* or *Polygalic Acid*, soluble in water or alcohol; also a little Tannic Acid.

Serpentaria. *Serpentary.* From *Aristolochia Serpentaria* (Aristolochiacæ). *Virginia.*
Rhizome and rootlets.

Contains a volatile oil, a resin, and *Tannin*.

Sumbul. From *Ferula Sumbul* (Umbelliferæ). Root. *Central Asia.*

Contains a volatile oil, two balsamic resins, one soluble in ether, one in alcohol, starch and *Sumbulic Acid*.

Taraxacum. *Dandelion.* From *Taraxacum Officinale* (Compositæ).
Root. *Native.*

Yields a milky juice, which contains caoutchouc, gum, albumen, sugar, and a bitter crystalline substance, *Taraxacin*, soluble in alcohol, sparingly in water.

Valeriana. *Valerian.* From *Valeriana Officinalis* (Valerianacæ).
Rhizome and rootlets, smelling of Valerianic Acid. *Native.*

Contains a hydrocarbon, *Borneene*, $C_{10}H_{16}$, and *Valerol*, $C_6H_{10}O$.

On exposure to air, Valerol is oxidized to form Valerianic Acid, $C_6H_{10}O_2$.†

On distilling the root with water, a volatile oil, consisting of Borneene, Valerol, Valerianic Acid, and probably other substances, is obtained.

The above principles are soluble in alcohol, sparingly in water. They are all volatile.

* Other varieties of Sarsaparilla contain Starch.

† In making the officinal Valerianates, the acid is produced by oxidizing Fusel-oil (amyl alcohol). See Sodæ Valerianas, in Section III.

Veratrum Viride. *Green Hellebore.* From *Veratrum Viride* (Melanthaceæ). Rhizome and rootlets. *N. America.*

Contains two active alkaloids, *Jervine* and *Veratroidine*. The latter is possibly a mixture of several principles.

Zingiber. *Ginger.* From *Zingiber Officinale* (Zingiberaceæ). Rhizome, scraped. *E. & W. Indies.*

Contains a volatile oil, a pungent resin, soluble in alcohol, not in water, and a great deal of starch.

OFFICIAL PREPARATIONS.

Extractum Belladonnæ Alcoholicum (see p. 5).

Extractum Calumbæ.

Extractum Colchici (see p. 4).

Extractum Colchici Aceticum (see p. 4).

Extractum Gelsemii Alcoholicum (see p. 5).

Extractum Gentianæ.

Extractum Glycyrrhizæ.

Extractum Jalapæ.

Extractum Kramerizæ.

Extractum Pareiræ.

Extractum Rhei.

Extractum Taraxaci (see p. 4).

Extractum Cimicifugæ Liquidum.

Extractum Filicis Liquidum (p. 5).

Extractum Glycyrrhizæ Liquidum.

Extractum Pareiræ Liquidum.

Extractum Sarsæ Liquidum.

Succus Taraxaci.

Infusum Calumbæ. Made with *cold* water, on account of the starch.

Infusum Gentianæ Co. Flavoured with Orange and Lemon Peels.

Infusum Kramerizæ.

Infusum Rhei.

Infusum Senegæ.

Infusum Serpentariæ.

Infusum Valerianæ.

Decoctum Pareiræ.

Decoctum Sarsæ.

Decoctum Sarsæ Co. Made with Sassafras, Guaiac Wood, Mezereon, and Liquorice Root.

Decoctum Taraxaci.

Tinctura Aconiti.

Tinctura Arnicæ.

Tinctura Calumbæ.

Tinctura Cimicifugæ.

Tinctura Gelsemii.

Tinctura Gentianæ Co. Flavoured with Orange Peel and Cardamoms.

Tinctura Jalapæ.

Tinctura Krameriæ.

Tinctura Pyrethri.

Tinctura Rhei. Flavoured with Cardamoms and Coriander, and coloured with Saffron.

Tinctura Scillæ.

Tinctura Senegæ.

Tinctura Serpentariæ.

Tinctura Sumbul.

Tinctura Valerianæ.

Tinctura Valerianæ Ammoniata (see p. 6).

Tinctura Veratri Viridis.

Tinctura Zingiberis.

Tinctura Zingiberis Fortior. Four times the strength of Tr. Zingiberis.

Acetum Scillæ. A "Tincture" made with dilute Acetic Acid (p. 7); about the same strength as Tr. Scillæ.

Spiritus Armoraciæ Co. (p. 7).

Vinum Colchici.

Vinum Ipecacuanhæ. A solution in Sherry of an extract made with Acetic Acid: 1 drm. corresponds to 2·7 gr. of Ipecac.

Vinum Rhei. Flavoured with Canella Alba.

Syrupus Hemidesmi.

Syrupus Rhei. Flavoured with Coriander.

Syrupus Scillæ. Made with Vinegar of Squill.

Syrupus Zingiberis. Made with Tr. Zingib. Fort.

Oxymel Scillæ. A mixture of Honey and Vinegar of Squill, concentrated.

Pulvis Glycyrrhizæ Co. Equal parts of Senna and Liquorice-root, half as much of Fennel and of Sublimed Sulphur, with three times the amount of Sugar.

Pulvis Ipecacuanhæ Co. *Dover's Powder.* Equal parts of Opium and Ipecacuanha, with eight times the amount of Potassium Sulphate.

Pulvis Rhei Co. *Gregory's Powder.* Rhubarb, with thrice the amount of Light Magnesia and half the amount of Ginger.

Pulvis Jalapæ Co. Five parts of Jalap, one of Ginger, nine of Cream of Tartar.

Trochisci Ipecacuanhæ. $\frac{1}{4}$ gr. in each.

Trochisci Morphinae c. Ip. $\frac{1}{12}$ th gr. of Ipecacuanha in each, with $\frac{1}{36}$ th of Morphinae Hydrochloras.

Pil. Ipecacuanhæ cum Scilla. Dover's Powder, with Squill and Ammoniac, made up with Treacle. 1 of Opium in 50.

Pil. Rhei Co. Rhubarb, Aloes, and Myrrh, with Soap, Glycerine, and Treacle; scented with Oil of Peppermint.

Pil. Scillæ Co. Squill, Ammoniac, Ginger, Soap, and Treacle.

Ung. Belladonnæ. Made from the "Alcoholic Extract." 1 part in 10.

Linimentum Aconiti. A strong Tincture, about five times the strength of Tr. Aconiti, with Camphor.

Linimentum Belladonnæ. A strong Tincture, with Camphor.

Emplastrum Belladonnæ. Made with the "Alcoholic Extract." 1 part in 5.

Aconite Extract, Belladonna (green) Extract, Juice, and Tincture, are prepared from the leaves (see pp. 28, 29).

Aconitina and Atropina (see p. 64) are extracted from the roots, not from the leaves.

Podophyllum is only used as a source of Podophyllin.

Scammony-root " Scammony Resin.

Sassafras is contained in Dec. Sarsæ Co. There is no other officinal preparation of it.

ELEVENTH GROUP:—FRUITS, 28. GLANDS FROM FRUIT, 2.

a. The following twelve and their preparations are of minor importance, being little more than vehicles and flavouring agents (see p. 3).

Anethum. *Dill.* From Peucedanum Graveolens (Umbelliferæ). *Native.*
Achenes.

Contains **Oleum Anethi** (see p. 46).

Aurantii Fructus. *Bitter Orange.* From Citrus Vulgaris (Aurantiaceæ).
Fresh fruit. The peel only is used (see p. 37). *S. Europe.*

The outer part of the peel contains a volatile oil, the inner a bitter principle and a little Gallic Acid.

Aurantii Cortex. *Bitter Orange Peel.*

The outer part of the peel of the same, dried.

Aqua Aurantii Floris is officinal (see p. 22).

Caruum. *Caraway.* From *Carum Carui* (Umbelliferæ).
Achenes.

Contains **Oleum Carui** (see p. 46).

Coriandrum. *Coriander.* From *Coriandrum Sativum* (Umbelliferæ).
Native.

Adhering mericarps.

Contains **Oleum Coriandri** (see p. 46).

Fœniculum. *Fennel.* From *Fœniculum Capillaceum* (Umbelliferæ).
Europe.

Achenes.

Contains a volatile oil.

Limonis Succus. *Lemon-juice.* From *Citrus Limonum* (Aurantiaceæ).
S. Europe.

The fresh juice.

Contains *Citric Acid*, about 4 gr. in the drachm, some *Malic Acid*, and a little bitter principle; also some acid salts of Potassium.

Limonis Cortex. *Lemon-peel.*

The outer part of the same, fresh.

Contains **Oleum Limonis** (see p. 46), a bitter principle, and some Gallic Acid.

Mori Succus. *Mulberry-juice.* From *Morus Nigra* (Moraceæ). *Native.*

Contains *Tartaric Acid*, sugar, and red colouring matter.

Pimenta. *Pimento, or All-Spice.* From *Pimenta Officinalis* (Myrtaceæ).
W. Indies.

Unripe berries, dried.

Contains **Oleum Pimentæ** (see p. 46) and Tannic Acid.

Rosa Canina. *Hips.* From *Rosa Canina*, *Dog-rose* (Rosaceæ). *Native.*

Contains *Citric* and *Malic Acids* and their salts, sugar, and a little Tannin.
The hairy achenes are irritating to the bowels.

Uvæ. *Raisins.* From *Vitis Vinifera* (Vitaceæ).

Spanish raisins only.

Contain glucose and Acid Tartrate of Potassium.

OFFICINAL PREPARATIONS.

Aqua Anethi.

Aqua Carui.

Aqua Fœniculi.

Aqua Pimentæ.

Infusum Aurantii. From the dried peel.

Infusum Aurantii Co. Ditto, flavoured with Lemon Peel and Cloves.

Tinctura Aurantii. From the dried peel.

Tinctura Aurantii Recentis. From the outer part of the peel of the fresh fruit.

Tinctura Limonis. From the peel.

Syrupus Aurantii. Syrup, flavoured with Tr. Aurantii.

Syrupus Limonis. Made with the fresh juice, flavoured with the peel.

Syrupus Mori. Ditto. Violet red.

Confectio Rosæ Caninæ. The "seeds" (achenes) are excluded. Liable to candy on keeping.

Coriander is used to flavour several preparations.

Raisins to flavour Tr. Cardam. Co., and Tr. Sennæ.

Confect. Ros. Caninæ is intended as a pill basis.

Lemon-juice is often used as a solution of Citric Acid in making effervescent draughts. The juice of Lemons is the source of Acidum Citricum (see Section III).

Vinum Aurantii (see "Alcohol," Section III) is not a Pharmacopœial preparation, but the "Orange Wine" of the Grocers' shops.

β. The remainder are used for their medicinal properties, but are of variable importance.

Anisi Fructus. *Aniseed.* From *Pimpinella Anisum* (Umbelliferae).
China.
Achenes.

Contains **Ol. Anisi** (p. 47).

Anisi Stellati Fructus. *Star-Anise.* From *Illicium Anisatum* (Magnoliaceae). *China.*
Ditto.

Bela. *Bael-fruit.* From *Ægle Marmelos* (Aurantiaceae). *Malabar.*
Half-ripe fruit, dried.

Contains an astringent principle, supposed to be allied to Tannic Acid, but as yet incompletely studied.

Capsicum.* From *Capsicum Fastigiatum* (Solanaceae). *Zanzibar.*
Membranous pods, varying much in size.

Contains a red acrid oil, volatilizable by heat, soluble in alcohol, sparingly in water.

Cassia. From *Cassia Fistula* (Leguminosae). *E. & W. Indies.*
The pulp from the pods.

Contains sugar, mucilage, and pectin. The active principle has not been isolated.

* Cayenne Pepper consists of powdered Capsicums. Capsicum is the chief ingredient of Curry Powders.

Colocynthis. *Colocynth.* From *Citrullus Colocynthis* (Cucurbitaceæ).
India ; Levant.

The fruit, freed from rind and seeds, dried.

Contains a bitter purgative principle, viz., the glucoside *Colocynthin*, soluble in water and alcohol.

Conii Fructus. *Hemlock Fruit.* From *Conium Maculatum* (Umbelliferæ).
Native.

Unripe fruit, dried.

Contains *Conine* ($C_8H_{15}N$), and *Methyl-Conine* ($CH_3.C_8H_{14}N$).

Conii Folia are officinal (see p. 27).

Cubeba. *Cubebs.* From *Piper Cubeba* (Piperaceæ). *Java.*

Contains about 10 p.c. of **Oleum Cubebæ** (see p. 47), a principle *Cubebin*, allied to Piperin, soluble in alcohol, and a resin, which, extracted with the volatile oil, forms **Oleo-resina Cubebæ** (p. 51).

Ecballium. *Squirting Cucumber.* From *Ecb. Elaterium* (Cucurbitaceæ).
S. Europe.

A pepo, which when ripe, separates from its stalk, and expels, through the aperture left at the insertion of the stalk, the seeds and the juice surrounding them.

Gathered before complete ripeness and separation from the stalk.

The sediment strained from the juice is alone used, under the name of **Elaterium** (see p. 58). From it is extracted an active principle **Elaterinum** (p. 64).

Ficus. *Figs.* From *Ficus Carica* (Moraceæ). *Asia Minor.*
Dried Figs.

The numerous achenes ("seeds") contained in the pulp are a mechanical stimulant to the intestines.

Kamala. *Wurru.* From *Mallotus Philippinensis* (Euphorbiaceæ). *India.*
Minute superficial glands and hairs from the capsules, forming a red powder.

Contains 80 p.c. of resins soluble in alcohol, a trace of volatile oil and of tannin. The resins yield a crystalline principle, *Rottlerin*.

Lupulinum. Minute glands from the dried strobiles of the Hop (*Humulus Lupulus*, p. 21), forming a fine powder.

Contains a volatile oil.

Papaver. *Poppy Capsules.* From *Papaver Somniferum* (Papaveraceæ).
Native.

Nearly ripe, dried. A star-like stigma at the apex. Variable in size.

The capsule contains a minute quantity of the active principles found in Opium.

The seeds contain a fixed oil, *Poppy Oil*, which has no medicinal properties.

The same capsules in an unripe state yield **Opium** (see p. 59).

Piper. *Black Pepper.* From *Piper Nigrum* (Piperaceæ). *India.*
Berries ("Peppercorns").

"White Pepper" consists of decorticated peppercorns.

Contains a volatile oil, an acrid resin, and a tasteless nitrogenised principle, *Piperin*, $C_{17}H_{19}NO_3$, which is colourless when quite free from the oil. *Piperin* is isomeric with *Morphine*.

Prunum. *Prunes.* From *Prunus Domestica* (Rosaceæ). *Europe.*
Dried Plums.

Contains an undetermined purgative principle, sugar and Malic Acid.

Sabadilla. *Cevadilla.* From *Schoenocaulon Officinale* (Melanthaceæ).
Mexico.

Follicles, dried.

Contains *Veratrina* (see p. 67).

Tamarindus. *Tamarind.* From *Tamarindus Indica* (Leguminosæ).

Pulp preserved in sugar. The West Indian is alone official.

Contains free Acids:—*Citric*, *Tartaric*, and *Malic*: *Acid Potassic Tartrate*, sugar and pectin.

OFFICIAL PREPARATIONS.

Aqua Anisi, from *Anisi Fructus*.

Extractum Belæ Liquidum.

Extractum Colocynthis Co. A spirituous extract, mixed, before evaporation, with extract of Socotrine Aloes, Scammony Resin, and hard Soap; flavoured with powdered Cardamoms.

Extractum Papaveris. Of the capsules alone, without the seeds.

Decoctum Papaveris. Of the seeds as well as the capsules; contains mucilage and oil.

Syrupus Papaveris. Of the capsules only (p. 38).

Tinctura Capsici.

Tinctura Conii. The only preparation of Hemlock Fruit, the *Extract* and *Juice* being made from the leaves, the *Pill-mass* from the extract, the *Inhalation* of Conine from the Juice.

** Said by Dr. John Harley to be an almost inert preparation.

Tinctura Cubebæ.

Confectio Piperis. Made with Honey, flavoured with Caraway.

Pil. Colocynthis Co. Made of Colocynth with twice the amount of Barbadoes Aloes and of Scammony Resin, mixed with a little Sulphate of Potassium, and scented with Oil of Cloves.

Pil. Col. et Hyoscyami. The same, with half as much of Extract of Henbane.

Cassia, Figs, Prunes and Tamarind form part of Confection of Senna.

Cevadilla is used only as a source of Veratrine, Ecballium as a source of Elaterium.

TWELFTH GROUP:—SEEDS. 16. GOSSYPIUM.

Nux Vomica, *Physostigma*, and *Stramonium*, are important and active drugs. The remainder are of minor importance as medicinal drugs, though some are in extensive use as vehicles.

Amygdala Dulcis. *Sweet, or Jordan, Almond.* From *Prunus Amygdalus*, var. *dulcis* (Rosaceæ). *S. Europe; Syria.*

Large and long, easily distinguished from the Bitter Almond.

Contains **Oleum Amygdalæ** (see "Fixed Oils," p. 43), an albuminoid *Emulsin*, soluble in cold water, precipitated by boiling or by alcohol, sugar and gum.

Amygdala Amara. *Bitter Almond.* From the same species, var. *Amara*. *Morocco.*

Smaller and more ovate.

Contains, besides the above, a white crystalline glucoside, *Amygdalin*, $C_{20}H_{27}NO_{11}$, soluble in water and alcohol, slightly bitter. When water is added to the almond, the *Amygdalin* decomposes in the presence of the *Emulsin*, furnishing glucose, Prussic Acid, and volatile *Oil of Bitter Almonds* (Benzoyl Hydride), C_7H_6O .*

Cardamomum. *Cardamoms.* From *Elettaria Cardamomum* (Zingiberaceæ). *Malabar.*

Usually kept in the pericarps, but the seeds alone are officinal.

Contains a volatile oil, about $4\frac{1}{2}$ p.c., and colouring matter.

Colchici Semina. *Colchicum Seeds.* From *Colch. Autumnale* (Melanthaceæ). *Native.*

Contain an alkaloid, *Colchicine*.

The Corm also is officinal (see p. 30).

Farina Triticæ. *Wheat-flour.* From *Triticum Sativum* (Graminaceæ). *Native.*

Contains 52-75 p.c. of starch (see p. 61), 10-23 p.c. of gluten and albuminoids, 6-13 p.c. of dextrin and glucose, with Potassic and other salts.

Hordeum Decorticatum. *Pearl Barley.* From *Hordeum Distichon* (Graminaceæ). *Native.*

Barley, husked in a mill, the grains polished.

Contains on an average 68 p.c. of starch, 14 of gluten, albuminoids, etc., 2 of fatty matter, 2 of saline matter.

* $C_{20}H_{27}NO_{11} + 2H_2O = 2C_6H_{12}O_6 + HCN + C_7H_6O$. Commercial Oil of Bitter Almonds retains the Prussic Acid, to the extent of 4-8 p.c. The oil itself is not poisonous, and may be obtained in a pure state.

Lini Semina. *Linseed.* From *Linum Usitatissimum*, *Flax* (Linaceæ). *Native.*

Contains 20 p.c. of **Oleum Lini** (see "Fixed Oils," p. 43) in the kernel. The seed-coats contain *mucilage*.

Lini Farina. *Linseed-meal.* The above, ground to powder.

Myristica. *Nutmeg.* From *Myristica Fragrans* (Myristicaceæ). *E. Archipelago.*

The kernel invested with the closely adherent inner seed coat (dark brown), which dips down into the substance of the nutmeg, producing a veined appearance on section.

The "arillode" of the nutmeg constitutes *Mace*.

Contains the concrete fixed oil **Oleum Myristicæ Expressum** (see p. 43), and the volatile oil **Oleum Myristicæ** (see p. 46).

Nux Vomica. From *Strychnos Nux-Vomica* (Loganiaceæ). *India.*

Contains the alkaloids **Strychnina** (see p. 67) and *Brucine*, with *Strychnic* or *Igasuric Acid*.

The red colour which *Brucine* strikes with Nitric Acid is a test for parts of the *Nux Vomica* plant (see *Cusparia Bark*, p. 25).

Physostigma. *Calabar Bean.* *Eseré.* From *Physostigma Venenosum* (Leguminosæ). *W. Africa.*

Contains the alkaloids **Physostigmina** or *Eserine* (see p. 66), and *Calabarine*.

Sinapis. *Mustard.* From *Brassica Alba* and *Nigra* (Cruciferæ). *Native.*

The seeds of both plants powdered.

Both white and black seeds contain about 28 p.c. of a mild fixed oil, and an albuminoid substance, *Myrosin*, resembling *Emulsin* (see "*Amygdala Amara*" above).

White mustard seeds contain a glucoside, *Sinabin*, which yields glucose and an acrid fixed oil in presence of *Myrosin* and water.

Black mustard-seeds contain the glucoside *Myronic Acid*, as Potassium Myronate, $\text{KC}_{10}\text{H}_{18}\text{NS}_2\text{O}_{10}$. In presence of water at about 120° F., *Myrosin* determines decomposition of the Myronate, forming glucose, Hydric-Potassic Sulphate, and an acrid volatile oil, **Oleum Sinapis** (see pp. 45, 48).

Sinapis Alba. *White Mustard.* From *Brassica Alba* only.

The seeds, unground.

Sinapis Nigra. *Black Mustard.* From *Brassica Nigra* only.

The seeds, unground.

Staphisagria. From *Delphinium Staphisagria*, *Stavesacre* (Ranunculaceæ). *S. Europe.*

The active principle is a volatile oil, *Oil of Stavesacre*.

Stramonii Semina. *Stramony.* From *Datura Stramonium* (Atropaceæ). *Native.*

Contain an alkaloid, *Daturine*, which has the same properties as *Atropine*, but less powerful action.

Gossypium. *Cotton Wool.* From *Gossypium Barbadense*, and other species (Malvaceæ). *S. America; India.*

Fine hairs, formed of cells placed end to end;* attached to the seed-coat.

Nearly pure cellulose. Soluble in strong alkaline solutions. See *Pyroxylin* in Sec. III.

OFFICINAL PREPARATIONS.

Extractum Nucis Vomicae.

Extractum Physostigmatis.

Extractum Stramonii (p. 4).

Infusum Lini. Flavoured with Liquorice Root. Contains mucilage, holding some of the oil.

Decoctum Hordei (*Barley water*). 2 oz. in a pint.

Tinctura Cardamomi Co. A tincture of Cardamoms, Caraway, Raisins, and Cinnamon, coloured with Cochineal.

Tinctura Colchici Seminum.

Tinctura Nucis Vomicae. Made from the Extract.

Tinctura Stramonii.

Pulvis Amygdalæ Co. Sweet Almonds, powdered, with Sugar and Gum.

Mistura Amygdalæ. An emulsion made by rubbing Pulv. Amygd. Co. with water, strained through muslin. $2\frac{1}{8}$ oz. of the powder to the pint.

Unguentum Staphisagriae. Benzoated Lard treated with the crushed seeds and strained. Contains 10 p.c. of the essential oil.

Cataplasma Lini. A poultice made with 4 oz. of Linseed Meal and half a pint of boiling water.

Cataplasma Sinapis. A poultice made with $2\frac{1}{2}$ oz. each of Linseed Meal and Mustard, and a similar amount of water.

Charta Sinapis. Cartridge paper coated with Mustard by means of Liq. Gutta Percha.

Nux Vomica Seeds are softened by steaming before being powdered for use.

The other Colchicum preparations, the Extract, Acetic Extract, and Wine, are made from the Corm (pp. 33, 34).

Nutmeg enters into several compound preparations. (See the "Synopsis.")

Spirit of Nutmeg is made with the Volatile Oil (see p. 47).

Both Sweet and Bitter Almonds yield Ol. Amygdalæ (p. 48); the former only is used for the Compound Powder and the Mixture.

Wheat-flour is used to make Yeast-poultice (p. 12).

Pyroxylin (Gun-cotton) is prepared from Cotton wool. (See Section III.)

* Flax-fibres are formed of cells with tapering ends, overlapping.

THIRTEENTH GROUP:—FIXED OILS. 7.

Croton and Castor Oils are important drugs ; Nutmeg Butter is used for external application ; the rest are vehicles.

Fixed oils are composed of Glyceric Salts of Acids of the Acetic or the Oleic Series. They cannot be distilled unchanged. With caustic alkalies, and some metallic oxides, they yield the corresponding alkaline or metallic salts, and glycerine. (See Glycerinum; Sapo Mollis, under "Potassium"; Sapo Durus and Animalis, under "Sodium"; Emplastrum Plumbi, under "Lead"; in Section III.)

They are extracted by expression, and in the case of the liquid oils, are of finest quality when expressed without the aid of heat. Heat either produces partial decomposition, or causes them to be contaminated with other constituents of the plant. Cold expression is expressly demanded by the Pharmacopœia in the case of Linseed Oil.

The concrete oils, which are solid at ordinary temperatures, require the aid of heat in expression.

Oleum Amygdalæ. *Almond Oil.* From the seeds (Almonds) of *Prunus Amygdalus*, sweet and bitter varieties (Rosaceæ) (see p. 40).

Chiefly glyceric Oleate (Olein).

Ol. Crotonis. *Croton Oil.* From the seeds of *Croton Tiglium* (Euphorbiaceæ). *India.*

Composition undetermined. Contains several fatty acids.

Ol. Lini. *Linseed Oil.* From the seeds of *Linum Usitatissimum* (Linaceæ) (p. 41).

Chiefly glyceric Lin-oleate and Margarate.

Ol. Myristicæ Expressum. *Nutmeg Butter.* From the kernels of *Myristica Fragrans* (Myristicaceæ), p. 41.

A concrete oil: contains a little volatile Oil of Nutmeg.

Myristic Acid has been isolated.

Ol. Olivæ. *Olive, or Sweet Oil.* From the fleshy fruit of *Olea Europæa* (Oleaceæ). *S. Europe.*

28 p.c. glyceric Margarate (Margarin), 72 p.c. glyceric Oleate (Olein).

Ol. Ricini. *Castor Oil.* From the seed of *Ricinus Communis* (Euphorbiaceæ). *India.*

Glyceric Ricinate, Ricin-oleate and Ricin-stearate.

- 01. Theobromatis.** *Cocoa Butter.* From the seeds of *Theobroma Cacao* (Byttneriaceæ). *Mexico and Central America; Mauritius.*
A concrete oil. Melts at 122° F.

The above oils are all soluble in ether, and insoluble in water.

The liquid oils are miscible one with the other in all proportions.

Castor oil mixes with absolute alcohol in all proportions, and is soluble in twice its volume of Rectified Spirit.

Croton oil, when freshly expressed without the aid of heat, is soluble in equal parts of alcohol, but by keeping loses its solubility.

The other fixed oils are only slightly soluble in alcohol. Admixture of any one with Castor Oil renders it more soluble in alcohol than the oil alone.

By prolonged exposure to air the fluid oils partly decompose, forming acrid products, and "becoming rancid."

Olive Oil is the least liable to such decomposition.

Linseed and Castor Oils become solid by prolonged exposure. They are therefore "drying oils."

At a temperature of 36° F., the margarin in Olive and Linseed Oils solidifies and separates.

OFFICINAL PREPARATIONS.

Linimentum Crotonis. A solution in equal parts of Oil of Cajeput and Rectified Spirit, 1 in 8.

Almond Oil is used in forming various ointments (see "Compound Preparations") and is the basis of Oleum Phosphoratum.

Olive Oil is used in forming various ointments, liniments, and plasters; also Charta Epispastica, and Enema Magnesii Sulphatis.

Castor Oil enters into Flexile Collodion, Compound Calomel Pill, and Lin. Sinapis Co.

Nutmeg Butter into Empl. Calefaciens and Empl. Picis.

Cocoa Butter is used as a basis for Suppositories (see p. 11).

FOURTEENTH GROUP:—VOLATILE OILS. 25.

The volatile oils of plants consist of Hydrocarbons, or of mixtures of Hydrocarbons with oxygenated derivatives, and in some cases of the oxygenated compounds alone.

Either a *Terpene*, $C_{10}H_{16}$, or a hydrocarbon of the composition $C_{15}H_{24}$, enters into the constitution of nearly all.

Oils of Turpentine, Scotch-fir, Savin, and Copaiba consist purely of Terpenes.

Oil of Juniper is a mixture of a Terpene with a $C_{15}H_{24}$ —hydrocarbon.

Oil of Cubebs is almost entirely $C_{15}H_{24}$ —hydrocarbons, with a little Terpene.

Oils of Lemon, Nutmeg, and Rosemary are Terpenes with a little oxygenated compound; the second contains also *Cymene* $C_{10}H_{14}$.

Eucalyptol is a mixture of a Terpene with Cymene and a little oxygenated compound.

Oils of Caraway, Cajeput, Chamomile, Lavender, Spearmint, Peppermint and Rue are mixtures of Terpenes with oxygenated compounds.

Oils of Dill, Anise, Cinnamon, and Pimento contain hardly any Hydrocarbon.

Oil of Coriander contains none; but only oxygenated compounds.

Oil of Cloves is almost entirely oxygenated, but contains a little $C_{15}H_{24}$ —hydrocarbon.

Oil of Mustard differs widely from all the rest, being *Allylic Sulphocyanide*, C_3H_5CNS . It is not a naturally existing oil, but in a sense an artificial product (see p. 41).

(Oxygenated Compounds.)

Oils of Lavender and Rosemary in cold weather deposit a solid substance of the same composition as, and supposed to be identical with, Camphor. It is also said to be contained in Oil of Cloves.

A liquid body of similar composition enters into the constitution of Oils of Spearmint, Caraway, Dill, and Nutmeg, and is variously known as *Menthol*, *Carvol* and *Myristicol*.

The term *Menthol* is used in the Pharmacopœia to denote a Stearoptene ("Peppermint Camphor") sometimes deposited by Oil of Peppermint in the cold, and obtained abundantly from the oil of varieties of *Mentha Arvensis* (see p. 62).

Amongst other oxygenated constituents that have been investigated may be mentioned *Anethol*, $C_{10}H_{12}O$, which forms the bulk of Oil of Anise; *Cinnamic Aldehyde*, C_9H_8O , which largely enters into Oil of Cinnamon; *Angelical Aldehyde*, which is found in Oil of Chamomile; and *Euodical Aldehyde*, $C_{11}H_{22}O$, in Oil of Rue.

All the volatile oils are soluble in alcohol and fixed oils, and to a slight extent in water.

They can be distilled without decomposition, and volatilize at ordinary temperatures, their vapours being powerfully odorous.

They are obtained by distillation (see p. 8).

This group may be arranged in two divisions; the first containing twelve oils used little more than as flavouring agents, the second containing thirteen which possess active medicinal properties.

(1st division, unimportant.)

- Oleum Anethi.** *Oil of Dill.* From the fruit (p. 35) of *Peucedanum Graveolens* (Umbelliferæ). *Native.*
- Ol. Carui.** *Oil of Caraway.* From the fruit (p. 36) of *Carum Carui* (Umbelliferæ). *Native.*
- Ol. Caryophylli.** *Oil of Cloves.* From the sun-dried buds (p. 23) of *Eugenia Caryophyllata* (Myrtaceæ). *E. Indian Islands.*
- Ol. Cinnamomi.** *Oil of Cinnamon.* From the inner bark (p. 25) of the shoots of *Cinnamomum Zeylanicum* (Myrtaceæ). *Ceylon.*
- Ol. Coriandri.** *Oil of Coriander.* From the dried fruit (p. 36) of *Coriandrum Sativum* (Umbelliferæ). *Native.*
- Ol. Lavandulæ.** *Oil of Lavender.* From the flowers of *Lavandula Vera* (Labiataæ). *Native.*
- Ol. Limonis.** *Oil of Lemons.* From the fresh peel (p. 36) of the fruit of *Citrus Limonum* (Aurantiaceæ). *S. Europe.*
- Ol. Menthæ Piperitæ.** *Oil of Peppermint.* From the fresh-flowering plant of *Mentha Piperita* (Labiataæ). *Native.*
- Ol. Menthæ Viridis.** *Oil of Spearmint.* From the fresh-flowering plant of *Mentha Viridis* (Labiataæ). *Native.*
- Ol. Myristicæ.** *Oil of Nutmeg.* From the kernel (p. 41) of the fruit of *Myristica Fragrans* (Myristicaceæ). *Eastern Archipelago.*
- Ol. Pimentæ.** *Oil of Pimento.* From the unripe fruit (p. 36) of *Pimenta Officinalis* (Myrtaceæ). *W. Indies.*
- Ol. Rosmarini.** *Oil of Rosemary.* From the flowering tops of *Rosmarinus Officinalis* (Labiataæ). *S. Europe.*

OFFICINAL PREPARATIONS.

Aqua Menthæ Piperitæ.**Aqua Menthæ Viridis.****Essentia Anisi.****Essentia Menthæ Piperitæ.**

} See p. 5.

Tinct. Lavandulæ Co. A weak tincture of Cinnamon, Nutmeg, and Red Sandal Wood, with a little Oil of Lavender, and a trace of Oil of Rosemary.**Spiritus Lavandulæ.****Spiritus Menthæ Pip.****Spiritus Myristicæ.****Spiritus Rosmarini.**

} All 1 volume of oil in 50.

The other flavouring waters, Aq. Anethi, Aq. Aurant. Floris, Aq. Carui, Aq. Cinnamomi, Aq. Feniculi, Aq. Pimentæ, Aq. Rosæ, Aq. Sambuci, are also preparations of volatile oils, but are ordered to be distilled directly from the raw drugs, and not from the oils (see p. 8).

Ol. Anthemidis forms part of Extr. Anthemidis.

(2nd division, important.)

- Oleum Anisi.** *Oil of Anise.* From the fruit (p. 37) of *Pimpinella Anisum*, *Anise* (Umbelliferae), and *Illicium Anisatum*, *Star Anise* (Magnoliaceae). *China.*
- Ol. Anthemidis.** *Oil of Chamomile.* From the flowers (p. 22) of *Anthemis Nobilis* (Compositae). *Native.*
- Ol. Cajuputi.** *Oil of Cajeput.* From the leaves of *Melaleuca Minor* (Myrtaceae). *Moluccas.*
- Ol. Copaibæ.** *Oil of Copaiva.* From *Copaiva* (p. 51).
- Ol. Cubebæ.** *Oil of Cubebs.* From the unripe fruit (p. 38) of *Piper Cubeba* (Piperaceae). *Java.*
- Ol. Eucalypti.** *Eucalyptol.* From the leaves of *Eucalyptus Globulus*, *Blue Gum tree*, *Eu. Amygdalina*, and probably other species of *Eucalyptus* (Myrtaceae). *Tasmania, Australia, Algeria.*
- Ol. Juniperi.** *Oil of Juniper.* From the unripe fruit of *Juniperus Communis* (Coniferae). *N. Europe.*
- Ol. Pini Sylvestris.** *Fir-wood Oil.* From the leaves of *Pinus Sylvestris*, *Scotch-fir* (Coniferae). *Norway; Scotland.*

- Ol. Rutæ.** *Oil of Rue.* From the leaves and unripe fruit of *Ruta Graveolens* (Rutaceæ). *Native.*
- Ol. Sabinæ.** *Oil of Savin.* From the fresh tops (p. 20) of *Juniperus Sabina* (Coniferæ). *Native.*
- Ol. Santali.** *Oil of Sandal-wood.* From the wood of *Santalum Album* (Santalaceæ). *India.*
- Ol. Sinapis.** *Oil of Mustard.* From the seeds (p. 41) of *Brassica Nigra* (Cruciferæ), after the expression of the fixed oil. *Native.*
 Formed in the process of distillation by the action of Myrosin on Myronic Acid (see p. 41).
- Ol. Terebinthinæ.** *Oil of Turpentine.* From the oleo-resin (*Turpentine*) exuding from the cut trunks of *Pinus Australis*, *P. Tæda*, *P. Sylvestris*, and *P. Pinaster*. (See p. 50, *Resina*.)

OFFICINAL PREPARATIONS.

Spiritus Cajuputi. 1 part of oil in 50.

Spiritus Juniperi. Do.

Linimentum Sinapis Co. A solution of Oil of Mustard, Castor Oil, Camphor, and Ethereal Extract of Mezerion, in Rectified Spirit.

Linimentum Terebinthinæ. Camphor and Soft Soap dissolved in Oil of Turpentine.

Linimentum Tereb. Aceticum. Four parts of Oil of Turpentine, and of Camphor Liniment, with one of Glacial Acetic Acid.

Unguentum Eucalypti. 1 in 5.

Unguentum Terebinthinæ. Half Oil of Turpentine.

Confectio Terebinthinæ. With Honey and Liquorice-root; 1 in 4.

Vapor Eucalypti. (See p. 10.)

Vapor Pini Sylvestris. (See p. 10.)

Enema Terebinthinæ. An ounce of the oil in 15 of Starch-Mucilage.

FIFTEENTH GROUP:—RESINS. 7.

All important except Mastic, which is rarely used. Resin is chiefly important as a vehicle.

The composition and chemical nature of resins are as yet incompletely investigated. They are oxygenated compounds; amorphous, solid and brittle at ordinary temperatures, softening and fusing by heat. They possess acid properties, forming soluble salts ("resin soaps") with alkalies, and insoluble salts with some metallic oxides.

They are for the most part soluble in alcohol and ether, insoluble in water. *From solution in alcohol they are precipitated in fine division by water; from solution in alkali by acids.*

The "Resins" obtained from plants are combinations of several resinous substances.

Guaiaci Resina. *Guaiacum Resin.* From the stem of *Guaiacum Officinale* or *G. Sanctum* (Zygophyllaceæ). *W. Indies.*

In "tears" or lumps. Exudes naturally, or from artificial incisions in the living trunk; but ordinarily melted out of billets of Guaiac wood (p. 24).

Soluble in spirit and ether, and in solutions of caustic alkalies.

Yields a little extractive matter to water. Discoloured green, then blue and brown, by nitric acid, ozone, chlorine, Ferric and Cupric chlorides; blue by gluten.

Jalapæ Resina. *Jalap Resin.* From **Jalapa** (p. 31).

Extracted by Rectified Spirit. Water is added before distilling off the spirit, to retain and wash away the gummy matters, &c.

Consists of *Convolvulin* and another resin.

Soluble in Rectified Spirit and alkaline solutions, partially in ether (not the *convolvulin*).

Mastiche. *Mastic.* From the stem of *Pistachia Lentiscus* (Anacardiaceæ). *Levant.*

Exudes from artificial incisions.

Contains a little volatile oil.

90 p.c. is soluble in Rectified Spirit.

Pix Burgundica. *Burgundy Pitch.* From the stem of *Pinus Picea*, *Spruce Fir.* (Coniferae). *Switzerland.*

The resinous portion of the oleo-resin (Turpentine) from the above tree, separated by melting and straining.

Still contains a little volatile oil, giving it its odour.

Almost entirely soluble in Rectified Spirit, and in twice its weight of Glacial Acetic Acid.

The genuine article is seldom found.

Resina. Rosin. From the oleo-resin (ordinary Turpentine) collected from the stem of *Pinus Australis*, *Pinus Tæda*, *Pinus Sylvestris*, and *Pinus Pinaster*. *America; France.*

The residue left after the distillation of **Ol. Terebinthinæ** (p. 48).

Consists of *Pinic Acid*, soluble in cold Rectified Spirit.

Sylvic „ „ warm „

Pimaric „ „ boiling „

All of the formula $C_{20}H_{30}O_2$.

All soluble in ether and volatile oils; uniting by fusion with wax and fixed oils; forming greasy salts (*resin-soaps*) with caustic alkalies.

Contains also a little water and volatile oil.

Podophylli Resina. Podophylline. From **Podophylli Radix** (p. 31).

Procured in fine powder by making a strong liquid extract from the rhizome with Rectified Spirit, and pouring it into water.

Soluble in Rectified Spirit and solutions of Ammonia.

Two active principles have been isolated, *Podophyllotoxin* and *Picropodophyllin*.

Scammoniaë Resina. Scammony Resin. From **Scammoniaë Radix** (p. 32) or **Scammonium** (p. 55). Procured in the same way as Jalap Resin.

Soluble in alcohol and ether.

The active principle is *Jalapin*, which is soluble in ether.

OFFICIAL PREPARATIONS.

Pulvis Scammonii Co. Scammony Resin, with three-fourths its weight of Jalap, one-fourth of Ginger.

Confectio Scammonii. Scammony Resin and Ginger, with Syrup and Honey, flavoured with Oils of Caraway and Cloves.

Tinctura Guaiaci Ammoniata. A solution of the Resin in *Sp. Amm. Aromaticus*.

Mistura Guaiaci. The Resin suspended (an emulsion) by Gum Arabic in sweetened Cinnamon water.

Unguentum Resinæ. See “Synopsis of Comp. Prep.”

Emplastrum Resinæ. „ „

Emplastrum Picis. „ „

Pilula Scammonii Co. $1\frac{1}{2}$ grain each of Scammony Resin and Jalap Resin in 5 grains, with Ginger; on a basis of curd soap.

SIXTEENTH GROUP :—OLEO-RESINS. 5.

Copaiba is the only one of any great importance.

Oleo-resins are formed by a combination of resins with volatile oils.

Copaiba. *Copaiva.* From the trunk of *Copaifera Langsdorffii* (Leguminosæ). *C. & S. America.*
Exudes from artificial incisions.

Contains 40 p.c. of **Ol. Copaibæ** (p. 47); the rest chiefly the resin
Copaivic Acid $C_{20}H_{30}O_2$.
Soluble in Rectified Spirit, ether, fixed and volatile oils.

Oleo-Resina Cubebæ. From **Cubeba** (p. 38).
Extracted by ether, according to a prescribed process.

Elemi. Said to be from *Canarium Commune* (Amyridaceæ). Source not exactly known. *Manilla.*

Neither the oily nor the resinous portion have been accurately examined.
Almost entirely soluble in Rectified Spirit.

Terebinthina Canadensis. *Canada Balsam.* From the stem of *Pinus Balsamea* (Coniferæ). *Canada.*
Exudes from artificial incisions.

Nearly the same as Ordinary Turpentine, containing resin and an oil resembling *Ol. Terebinthinæ* (p. 48).
Solidifies with Magnesia, resinous salts of Magnesia being formed, which absorb the volatile oil.
On exposure to air, the oil passes off, leaving the resin as a transparent varnish.

Thus Americanum. *Frankincense.* From *Pinus Australis* and *Tæda* (Coniferæ). *America.*
Concrete American Turpentine; a natural exudation. Solid.

Much the same composition as ordinary Turpentine, which is collected in artificial hollows made in the trunk, and is semi-fluid, as it contains more oil.

OFFICINAL PREPARATIONS.

Unguentum Elemi.

Canada Balsam enters into Charta Epispastica and Collodium Flexile; Frankincense is used in making Pitch Plaster, to improve its colour and consistence.

SEVENTEENTH GROUP :—BALSAMS. 4.

Balsams are resinous or oleo-resinous exudations, containing one or other, or both, of the volatile Aromatic Acids, *Benzoic*, $C_7H_6O_2$, or *Cinnamic*, $C_9H_8O_2$.

Of the four officinal Balsams, Benzoin contains the former, *Styrax* the latter, acid. *Peruvian Balsam* and *Tolu* contain both.

In Benzoin, the remaining constituents are resinous simply; in the others they comprise both resinous and oily matters, and a neutral principle, *Styracin*.

Balsamum Peruvianum. *Peruvian Balsam.* From the trunk of *Myroxylon Pereiræ* (Leguminosæ). *C. America.*
Exudes after removal of the Bark.

Soluble in Rectified Spirit.

Balsamum Tolutanum. *Tolu.* From the trunk of *Myroxylon Toluifera* (Leguminosæ). *C. America.*

Exudes after incising the bark. Soft when fresh: hardens on keeping, by decomposition of the oil into resin and Cinnamic Acid.

Soluble in Rectified Spirit.

Yields Cinnamic Acid to water.

Benzoinum. *Benzoin.* From the trunk of *Styrax Benzoin* (Styracaceæ). *Eastern Archipelago.*

Exudes after incising the bark.

See **Acidum Benzoicum** (p. 63).

Soluble in Rectified Spirit and solutions of caustic alkalies.

Styrax Preparatus. Purified *Storax.* From the inner bark of *Liquidambar Orientalis* (Liquidambaraceæ). *Asia Minor.*

Extracted by hot water and pressure; purified by melting or solution in Rectified Spirit, and straining.

Soluble in Rectified Spirit.

The volatile oil, *Styrol*, C_8H_8 , has aromatic properties.

OFFICINAL PREPARATIONS.

Tinctura Tolutana. Prepared from *Tolu*.

Tinctura Benzoini Co. *Friar's Balsam.* A tincture of Benzoin, *Storax*, Socotrine Aloes, and *Tolu*.

Syrupus Tolutanus. Prepared from *Tolu*; practically a syrup of Cinnamic Acid (p. 8).

Storax enters only into Tr. Benzoini Co.

For Adeps Benzoatus, see p. 15.

EIGHTEENTH GROUP:—GUMS. 2.

Important as vehicles.

Gums are carbo-hydrates, *i.e.*, substances whose molecules are formed of six, or some simple multiple of six, atoms of Carbon, with Hydrogen and Oxygen in the proportions of H_2 , O.

Acaciæ Gummi. *Gum Arabic.* From the stems of *Acacia Senegal* and other species of *Acacia* (Leguminosæ). *E. Africa.*

A natural exudation.

Consists almost entirely of the carbohydrate *Arabin*, $C_{12}H_{22}O_{11}$.

Soluble in equal parts of water, hot or cold; precipitated from solution by alcohol in excess. Insoluble in spirit, ether, or oils.

The solution forms an opaque white jelly with Plumbic Subacetate.

Tragacantha. *Tragacanth.* From the stem of *Astragalus Gummifer* (Leguminosæ). *Asia Minor.*

Exudes naturally, or from artificial incisions in the bark.

Consists of *Arabin*, and its modification *Metarabin*, which is insoluble in water, but absorbs it and swells up.

Metarabin is soluble in Rectified Spirit.

OFFICINAL PREPARATIONS.

Mucilago Acaciæ. 4 oz. of gum in 6 fl. oz. of water. A thick solution used to suspend insoluble powders, oils, etc., in mixtures.

“Oils require about three-fourths their weight, balsams and spermaceti equal parts, resins two parts, and musk 5 times its weight” (Pereira). The preparation develops Acetic Acid on being kept.

Mucilago Tragacanthæ. 60 grains of *Tragacanth*, with a little spirit, in half a pint of water. A similar preparation.

Glycerinum Tragacanthæ. A translucent jelly, made by rubbing 3 parts of *Tragacanth* with 12 of Glycerine and 2 of water.

Intended for use in forming pill-masses.

Pulvis Tragacanthæ Co. Equal parts of *Tragacanth*, Gum, and Starch, with three parts of sugar.

A vehicle for heavy powders.

NINETEENTH GROUP:—GUM-RESINS. 6.

All important drugs except Galbanum.

Gum-resins consist of Resins and Gums, with, in most cases, a volatile oil.

The resins generally form 65-80 p.c. of the whole, the gum 20-25 p.c., the oil about 4 p.c. In Scammony the resin is from 80 to 90 p.c., the gum from 6 to 20 p.c.

Of the Pharmacopœial gum-resins, Gamboge and Scammony contain no oil.

They form perfect emulsions when rubbed with water, the resin and oil being suspended by the gum.

Ammoniacum. *Ammoniac.* From the stem of *Dorema Ammoniacum* (Umbelliferæ). *Punjaub and Persia.*

Oozes from the punctures of insects as a milky juice, which hardens in the air. In two forms, "tears" and lumps.

Asafoetida. From the root of *Ferula Narthex*, *F. Scorodosma*, and other species (Umbelliferæ). *Punjaub, Persia.*

Oozes as a milky juice, which hardens in the sun, from incisions in the top of the root, producing "tears"; or from the surface of the root, cut off transversely, producing lumps.

The volatile oil contains sulphur, being *Allylic Sulphide* ($C_3H_5)_2S$.

Cambogia. *Gamboge.* From *Garcinia Hanburii* (Guttiferæ). *Siam.*

Exudes from the broken twigs or pedicels; generally run into hollow bamboo sticks to harden.

The resin is *Gambogic Acid*.

Galbanum. From *Ferula Galbaniflua*, *F. Rubricaulis*, and other species (Umbelliferæ). *India, Levant.*

Mode of collection not known. In "tears" or lumps.

Myrrha. *Myrrh.* From the stem of *Balsamodendron Myrrha* (Amyridaceæ). *Arabia.*

Exudes naturally from the bark. In "tears" or lumps.

The resin and oil are soluble in Rectified Spirit.

Scammonium. *Scammony.* From the root of *Convolvulus Scammonia* (*Convolvulaceæ*). *Asia Minor.*
Exudes from artificial excisions.

The resin is **Scammoniae Resina** (p. 50).
Scammoniae Radix is officinal (p. 32).

OFFICINAL PREPARATIONS.

Pil. Asafoetidae Co. Equal Parts of Asafoetida, Galbanum, and Myrrh.
Made up with Treacle.

Pil. Aloes et Asafoetidae, see next page.

Pil. Cambogiae Co. Equal parts of Gamboge, Barbadoes Aloes, and Pulv. Cinnamomi Co., with 2 parts of Hard Soap and a little Syrup.

Pil. Aloes et Myrrhæ, see next page.

Tinctura Myrrhæ.

Tinctura Asafoetidae. 1 in 8.

Spiritus Ammoniae Foetidus. A weaker preparation of Asafoetida, 1 in 13, a tenth part of the fluid being *Liq. Ammon. Fortior*.

Mistura Ammoniæ. An emulsion made by rubbing the gum-resin with water, strained.

Mistura Scammonii. A similar emulsion, made with milk.

Enema Asafoetidae. An emulsion formed by rubbing 30 gr. of the gum-resin in 4 oz. of water.

Emplastrum Galbani. Contains an equal amount of Ammoniacum.

Emplastrum Ammoniæ cum Hydrargyro. (See "Mercury," in Section III.)

TWENTIETH GROUP:—CONCRETE JUICES. 9. EXCRESCENCE. 1.

Manna is now seldom used; Gutta Percha is used as a vehicle; the others are highly important.

A.

Aloe Barbadosis. *Barbadoes Aloes.* From the fleshy leaf of Aloe Vulgaris (Liliaceæ). *Barbadoes.*

The juice flowing from the cut leaves, concentrated by boiling, and solidified. Inferior kinds are extracted from the leaves by pressure or boiling.

Contains **Aloin** (see p. 64), soluble in Rect. Spirit and boiling water, slightly in cold water; *Aloetic Acid*, which strikes olive-brown with ferric salts; a resin, which is soluble in boiling water, as well as in spirit; and about 60 p.c. of bitter matters, not yet accurately examined.

Aloe Socotrina. *Socotrine Aloes.* From the leaves of Aloe Perryi. *Socotra.*

The juice from the cut leaves dried in the sun.

Composition similar.

OFFICIAL PREPARATIONS.

Extractum Aloës Barbadosis.

Extractum Aloës Socotrinæ.

Decoctum Aloës Co. A decoction from the Extract of Socotrine Aloes, the Extract of Liquorice, and Myrrh, with Potassium Carbonate; coloured with Saffron, and flavoured with *Tr. Cardam. Co.*

Tinctura Aloës. A Tincture of Socotrine Aloes and Extract of Liquorice.

Vinum Aloës. From Socotrine Aloes, Ginger, and Cardamoms.

Pilula Aloës Barbadosis. 2 gr. in 5, with Hard Soap and Confection of Roses, scented with Oil of Caraway.

Pilula Aloës et Ferri. $\frac{3}{4}$ gr. of *Ferri Sulphas* and 1 gr. of Barbadoes Aloes in 5; with *Pulv. Cinn. Co.* and Confection of Roses.

Pilula Aloës et Asafoetidæ. $1\frac{1}{4}$ gr. of Socotrine Aloes and of Asafoetida in 5; with Hard Soap and Confection of Roses.

Pilula Aloës et Myrrhæ. $1\frac{2}{3}$ gr. of Socotrine Aloes, and half as much Myrrh, in 5; with Saffron, Treacle, and Glycerine.

Pilula Aloës Socotrinæ. Similar to *Pil. Aloes Barb.*; scented with Oil of Nutmeg.

Enema Aloës. 40 gr. of either variety rubbed with 15 of Potassic Carbonate in half a pint of Mucilage of Starch.

B.

Catechu Pallidum. *Pale Catechu.* From the leaves and young shoots of *Uncaria Gambier* (Rubiaceæ).

An extract made in Singapore and the Eastern Archipelago by boiling the leaves and shoots and evaporating to dryness.

Contains about 49 p.c. of a modification of *Tannic Acid*, which gives a green precipitate with Ferric salts, and becomes insoluble and dark red on exposure to air and moisture; and a crystalline principle, *Catechin*, soluble in boiling water, very slightly in cold.

Galla. *Galls.* From *Quercus Lusitanica*, var. *infectoria*, *Dyer's Oak* (Cupuliferæ). *Asia Minor.*

Exerescences on the small twigs, formed around the ova of the insect *Cynips Gallæ Tinctoriæ*, which it deposits in a puncture made in the bark.

Parenchymatous in structure, with a few vascular bundles.

Two kinds, "blue" and "white," the latter perforated by the aperture of the insect's escape.

Yields 35 p.c. of Tannic Acid, 5 p.c. of Gallic Acid (see Tannic and Gallic Acids in Section III.).

Kino. From the trunk of *Pterocarpus Marsupium* (Leguminosæ). *Malabar.*

Similar composition to Catechu, but contains less matter insoluble in cold water.

OFFICINAL PREPARATIONS.

Pulvis Catechu Co. Catechu, Kino, Rhatany, Cinnamon, and Nutmeg.

Pulvis Kino Co. Kino, with a little Cinnamon and 1 gr. of Opium in the scruple.

Infusum Catechu.

Tinctura Catechu, flavoured with Cinnamon.

Tinctura Gallæ.

Tinctura Kino. Contains Glycerine.

Trochisci Catechu. 1 gr. in each.

Unguentum Gallæ.

Unguentum Gallæ cum Opio. 4 gr. of Opium in the drachm.

C.

Manna. From the stem of *Fraxinus Ornus* (Oleaceæ). *Sicily.*

Exudes from artificial incisions.

Contains 60-80 p.c. of *Mannite*, or Manna-Sugar, $C_6H_{14}O_6$, with a little resin, and some bitter extractive matter, in which the active properties probably lie.

Chrysarobinum. *Goa-powder.* From the stem and branches of *Andira Araroba* (Leguminosæ: from Batria).

The medullary matter, dried and powdered.

About 80 p.c. is *Chrysophanic Acid*, $C_{10}H_8O_3$, which is the active principle

Elaterium. From the fruit of *Ecballium Elaterium* (Cucurbitaceæ).

A sediment from the juice surrounding the seeds (see **Ecballii Fructus**, p. 38) brought into the market directly, though the Pharmacopœia prescribes a mode of preparing it.

Contains 20 to 30 p.c. of **Elaterinum** (see p. 64).

OFFICINAL PREPARATION.

Unguentum Chrysarobini. 1 in 25.

D.

Gutta Percha. From *Dichopsis Gutta* (Sapotaceæ). *Eastern Archipelago.*

Collected from the felled trees. Coagulates spontaneously in air. Sliced and cleansed in England.

80 p.c. of the hydrocarbon $C_{20}H_{32}$, a milk white solid; the rest resins, formed by its oxidation.

Soluble in chloroform and Oil of Turpentine, sparingly in absolute alcohol; unaffected by dilute acetic, hydrochloric or hydrofluoric acids, or alkaline solutions.

Softens with heat.

OFFICINAL PREPARATION.

Liquor Gutta Percha. A solution in Chloroform, purified from the insoluble matters that contaminate commercial Gutta, by shaking with Carbonate of Lead, which carries them to the bottom.

E.

Opium. From the unripe capsules (p. 38) of *Papaver Somniferum* (Papaveraceæ). *Asia Minor*.

Exudes from artificial incisions and inspissates spontaneously, forming "tears," which are collected and pressed into masses.

The Pharmacopœia prescribes Opium obtained in Asia Minor only.

Irregular round or flattened lumps, from $\frac{1}{4}$ lb. to 2 lb. in weight; usually covered with portions of poppy-leaves and scattered over with the chaffy fruits of a species of rumex. On fracture, they are seen to be made up of agglutinated "tears."

The Pharmacopœia requires that the Opium, when thoroughly dried, should yield 10 p.c. of Morphine.

Egyptian, Persian, English and East Indian Opium are not officinal, and are usually inferior to the Asia Minor Opium.

From Opium have been isolated some fourteen alkaloids, of which the most important are *Morphine*, *Codeine*, *Thebaine*; a neutral crystalline body, *Meconin*; and two acids:—*Meconic*, $C_7H_4O_7$, and *Thebolactic* (probably the same as *lactic*).

Resins, gums, and extractive matters, with some caoutchouc, volatile oil, fatty matters and salts form the basis.

Morphina is officinal in the forms of its *Acetate*, *Hydrochlorate*, *Sulphate*, and *Bimeconate* (see p. 66).

Codeina is officinal (see p. 66).

Apomorphina, an artificial alkaloid obtained from Morphia, is also officinal in the form of a Hydrochlorate (see p. 67).

Acidum Meconicum is officinal (see p. 63).

OFFICIAL PREPARATIONS.

Extractum Opii.

Extractum Opii Liquidum. A solution of the Extract in water, with a little spirit added.

Tinctura Opii.

Tinctura Opii Ammoniata. A tincture of Opium and Benzoic Acid, made with a menstruum 4 parts Rectified Spirit, 1 part *Liq. Amm. Fort.*; flavoured with Oil of Anise, and coloured with Saffron.

Tinctura Camphoræ Co. A weaker tincture of Opium, Benzoic Acid, and Camphor; made with Proof Spirit, and flavoured with Oil of Anise.

Vinum Opii. Made from the Extract of Opium with Sherry; flavoured with Cinnamon and Cloves.

Pulvis Cretæ Aromaticus cum Opio. *Pulv. Cretæ Aromat.* (see Sect. III.) with 1 grain of Opium in 40.

Pulvis Opii Co. Opium with Black Pepper, Ginger, and Caraway; and a little Tragacanth.

Confectio Opii. One part of the above Powder mixed with three parts of Syrup.

Pil. Saponis Co. Opium in Castile Soap and Glycerine. 1 grain in 6.

Pil. Plumbi cum Opio. Acetate of Lead and Opium, with Confection of Roses. 1 grain in 8.

Trochisci Opii. Made with the Extracts of Opium and Liquorice, flavoured with Tr. of Tolu.

Enema Opii. Half a drachm of *Tr. Opii* in 2 ounces of Starch Mucilage.

Suppositoria Plumbi Co. Made with Acetate of Lead and Opium.

Linimentum Opii. Equal parts of *Tr. Opii* and *Lin. Saponis*.

Ung. Gallæ cum Opio (see p. 57).

Emplastrum Opii. On a basis of Resin Plaster.

Opium is contained in three other Official Preparations. They are printed in italics in the subjoined table.

OFFICIAL PREPARATIONS CONTAINING OPIUM. AMOUNT OF PREPARATION CONTAINING,
OR CORRESPONDING TO, 1 GRAIN OF SOLID OPIUM.

Extr. Opii	...	...	...	...	$\frac{1}{2}$ gr.
Pulv. Opii Co.	}	...	...	...	10 gr.
<i>Pulv. Ipecac. Co.</i> (p. 34)		...	...	...	20 gr.
<i>Pulv. Kino Co.</i> (p. 57)	...	...	...	...	40 gr.
Pulv. Cretæ Arom. c. Op.	}	...	...	...	...
Confect. Opii		...	...	...	...
Lozenges	...	...	...	...	Five.
Pil. Saponis Co.	...	...	...	...	6 gr.
Pil. Pb. c. Opio	...	...	...	...	8 gr.
<i>Pil. Ipecac. c. Scillâ</i> (p. 35)	...	...	...	...	23 gr.
Extr. Opii Liq.	}	...	...	...	11 min.
Vinum Opii		...	...	...	...
Tinct. Opii	...	...	...	...	$14\frac{1}{2}$ min.
Tr. Op. Ammon.	...	...	...	...	96 min.
Tr. Camph. Co.	...	...	...	...	$\frac{1}{2}$ oz.
Enema Opii	...	...	...	...	1 oz.
Lin. Opii	...	...	...	...	$\frac{1}{2}$ drm.
Empl. Opii	...	...	...	...	10 gr.
Ung. Gallæ c. Opio	...	...	...	...	14 gr.
Suppos. Pb. Co.	...	...	...	...	One suppository.

TWENTY-FIRST GROUP:—ACTIVE PRINCIPLES OF DEFINITE
CHEMICAL COMPOSITION. 32.

All important

A. Two Carbohydrates, used as vehicles.

Amylum. *Starch.* $C_6H_{10}O_5 + 2H_2O$.

On exposing flour in contact with water for a week or two, fermentation takes place, and Acetic Acid is formed, which disaggregates and partly dissolves the gluten. The gluten, sugar, gum, acid, etc., being washed away, starch remains, nearly pure, containing only some mineral salts. It is moulded and dried.

Wheat, maize, and rice starch are officinal.

Rendered anhydrous at 230° F. in dry air. Converted into dextrin and sugar at 320° F. in closed vessels.

Insoluble in cold water, alcohol, and ether. Forms a mucilage with water at 195° F.

Converted into dextrin and sugar by prolonged boiling in water, by saliva, malt extract, and mineral acids.

Saccharum Purificatum. *Loaf-sugar.* $C_{12}H_{22}O_{11}$.

Contained in the sap of the *Sugar-cane*, *Saccharum Officinarum* (Graminaceæ), and of the *Beet-root*, *Beta Vulgaris* (Chenopodiaceæ).

The expressed sap of the sugar-cane, being freed from albuminoids by heating with lime and drawing off from the scum, and concentrated by boiling, yields impure crystalline sugar (*raw* or *brown sugar*) and an uncrystallizable modification, *Molasses* or *Golden Syrup*.

The crystalline sugar being redissolved, the solution filtered through cotton, then through animal charcoal, and concentrated, it crystallizes out in a pure form. The mother syrup yields a less pure sugar, and an uncrystallizable modification, known as *Treacle*.

Beet-root sugar is refined at once, the "raw" sugar having so unpleasant a taste as to be uneatable.

Both beet and cane sugar occur commercially in masses or "loaves" of minute crystals. Larger crystals are exceptionally produced.

Soluble in less than half its weight of water; in 100 parts of Rectified Spirit.

(The Treacle referred to above is included in Section III as a manufactured product, see **Theriaca**.)

OFFICINAL PREPARATIONS.

Syrupus. A strong solution of Sugar, containing 6 parts in 7, made by dissolving Sugar in half its weight of water.

Mucilago Amyli. A solution (? suspension) formed by boiling 2 drms. of Starch in half a pint of water.

Used as a vehicle for enemata, and for stiffening bandages.

Glycerinum Amyli. A translucent jelly, formed by heating Starch with 5 parts of Glycerine and 3 of water.

Intended as an ointment.

B. Three Stearoptenes.

Camphora. *Camphor.* $C_{10}H_{16}O$.

Sublimed from the wood of *Cinnamomum Camphora* (Lauraceæ).
China, Japan.

Tough crystalline masses; colourless.

Soluble in spirit, Ether, Chloroform, or fixed oils.

Volatile.

Menthol. *Peppermint, or Chinese, Camphor.* $C_{10}H_{20}O$.

Deposited on cooling from "Chinese Oil of Peppermint," the volatile oil of *Mentha Arvensis*, vars. *piperascens* et *glabrata* (Labiatae).
China, Japan.

Acicular crystals, or fused crystalline masses; colourless.

Freely soluble in spirit, Ether, and fixed oils; sparingly in water.

Volatile, with a strong odour of Peppermint.

Thymol. $C_{10}H_{14}O$.

From the volatile oils of *Thymus Vulgaris*, *Thyme* (Labiatae), *Monarda Punctata*, *Horse-mint* (Labiatae), and *Carum Ajowan* (Umbelliferae).
United Kingdom, N. America, and India.

Obtained either by exposing a distilled fraction of the oil at a low temperature, or by saponifying with caustic soda and separating by means of Hydrochloric Acid. Purified by recrystallization.

Large prisms; colourless.

Soluble in $\frac{1}{4}$ part of Rectified Spirit; freely in ether; in 200 parts of glycerine; sparingly in water.

Volatile.

OFFICIAL PREPARATIONS.

Aqua Camphoræ. Water saturated with Camphor.

Tinctura Camphoræ Co. A preparation of Opium (see p. 59).

Spiritus Camphoræ. $5\frac{1}{2}$ grs. in the drachm.

Linimentum Camphoræ. A strong solution in Olive Oil.

Linimentum Camphoræ Co. A solution of Camphor and Ammonia in spirit, scented with Oil of Lavender.

C. Two Acids.

Acidum Benzoicum. *Benzoic Acid.* $C_7H_6O_2$.

Sublimed from **Benzoinum** (p. 52).

Silky plates or needles.

Soluble in 4 parts of Rectified Spirit, 12 parts of boiling water, 400 parts of cold water.

Sublimes at $462^\circ F$.

Acidum Meconicum $C_7H_4O_7$.

From Opium (p. 59).

Used to make *Liq. Morphinae Bimeconatis* (p. 66).

Micaceous crystals; colourless.

Freely soluble in Rectified Spirit.

Sparingly in water.

OFFICIAL PREPARATION.

Trochisci Ac. Benzoici. $\frac{1}{2}$ gr. in each.

D. One Glucoside.

Salicinum. *Salicin.* $C_{13}H_{18}O_7$.

From the bark of *Salix Alba* and other species of *Salix*, *Willow* (Salicaceæ), and of various species of *Populus*, *Poplar* (Salicaceæ).
Native.

White scales and silky needles.

Soluble in 28 parts of water or Rectified Spirit.

Boiled with dilute Sulphuric Acid or treated with Emulsin, it yields glucose and *Saligenol*, $C_7H_8O_2$.*

Oxidized by Potassium Bichromate and Sulphuric Acid, it yields *Salicylol*,† $C_7H_6O_2$, a compound which forms the essential oil of *Spiræa Ulmaria* (*Meadow-sweet*). (See Salicylic Acid, in Section III.)

* $C_{13}H_{18}O_7 + H_2O = C_6H_{12}O_6 + C_7H_8O_2$.

† Salicylol is found in the urine of patients taking Salicin. It strikes a deep purple with Ferric Salts.

E. Three Neutral Principles.**Aloin.** $C_{16}H_{18}O_7$.From **Aloes** (p. 56).

Yellow acicular crystals.

Freely soluble in hot fluids; sparingly in cold water or spirit.

Decomposed by alkalis.

Elaterinum. *Elaterin.* $C_{20}H_{28}O_5$.From **Elaterium** (p. 58).

Extracted with chloroform and precipitated by ether.

Small crystals; colourless.

Insoluble in water, sparingly soluble in Rectified Spirit.

Santoninum. *Santonin.* $C_{15}H_{18}O_3$.From **Santonica** (p. 23), by a method detailed on p. 73.

Flat rhombic prisms, becoming yellow in sunlight.

Freely soluble in Chloroform and fixed oils, in 50 parts of Rectified Spirit, very slightly in water.

It acts as an acid in presence of alkalis.

Sodic Santonate is soluble in water.**OFFICINAL PREPARATION.****Trochisci Santonini.** 1 gr. in each.**Pulvis Elaterini Co.** With Sugar of Milk. 1 in 40.**F. Twenty-one Alkaloids and Alkaloidal Salts.****Aconitina.** *Aconitine.* $C_{30}H_{47}NO_7$.From **Aconiti Radix** (p. 30), by a method detailed on p. 69.

Amorphous powder.

Soluble in 150 parts of cold water, 50 of hot, more freely in spirit.

Fusible.

Atropina. *Atropine.* $C_{17}H_{23}NO_3$.From **Belladonnæ Radix** (p. 30), by a method detailed on p. 69.

Acicular crystals.

Soluble in 8 parts of Rect. Spirit, 500 of water.

Atropinae Sulphas. Produced by neutralizing Atropine with diluted Sulphuric Acid and evaporating to dryness at 100° F.

Amorphous powder.

Soluble in 4 parts of water.

Beberinæ Sulphas. *Sulphate of Beberine.* Probably a mixture of Sulphates of Beberine and Nectandrine.

From **Nectandræ Cortex** (p. 26), by a method detailed on p. 70.

Translucent scales, dark brown.

Soluble in 80 parts of water, slightly in spirit.

Caffeina. *Caffeine or Theine.* $C_8H_{10}N_4O_2 \cdot H_2O$.

From the seeds of *Coffea Arabica*, *Coffee* (Rubiaceæ), the leaves of *Camellia Thea*, *Tea* (Camelliaceæ), and the seed (*Kola Nut*) of *Cola Acuminata* (Sterculiaceæ). *The first from Ceylon, Java, India, &c.; the second from China and India; the third from Africa.* Extracted by aqueous infusion.

Silky acicular crystals, colourless.

Soluble in 80 parts of water, 150 of Rectified Spirit.

Caffeinæ Citras.

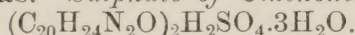
From the above, by dissolving in a solution of Citric Acid, and evaporating at 100° F.

Powdered.

Soluble in a mixture of 2 parts of Chloroform with 1 part of Rectified Spirit.

Forms a syrupy fluid with a little water, which precipitates Caffeine on dilution, the precipitate redissolving when 10 parts of water are added.

Cinchonidinæ Sulphas. *Sulphate of Cinchonidine.*



From the mother liquors of the manufacture of Sulphate of Quinine, (p. 66) by evaporation.

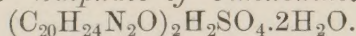
Purified by crystallization from alcohol and then from hot water.

Silky acicular crystals.

Soluble in water, alcohol, or ether; readily in dilute acids.

Solution not fluorescent.

Cinchoninæ Sulphas. *Sulphate of Cinchonine.*



From the mother liquor of the preceding manufacture, by precipitating the alkaloid with caustic soda, washing from other alkaloids with spirit, and dissolving in Sulphuric acid.

Purified by animal charcoal; crystallized.

Colourless vitreous prisms.

Soluble in 54 parts of water; freely in spirit and dilute acids.

Solution not fluorescent.

Cocainæ Hydrochloras. *Hydrochlorate of Cocaine.* $C_{17}H_{21}NO_4 \cdot HCl$.

From Coca (p. 27) by making an extract with acidulated spirit, rendering it alkaline with Carbonate of Sodium, making an ethereal extract from it, and repeating the whole process to purify the ethereal extract; decolorizing, and neutralizing with Hydrochloric Acid.

Crystallizes out on evaporation: Acicular crystals or crystalline powder.

Readily soluble in water, alcohol, and ether.

Codeina. *Codeine.* $C_{18}H_{21}NO_3 \cdot H_2O$.

From the solution left in the manufacture of Morphine salts (p. 71) by evaporating, dissolving from the residue with water, precipitating with caustic potash, redissolving in ether and crystallizing out.

Octahedra.

Soluble in 80 parts of water or *Liq. Ammonia*; readily soluble in spirit or diluted acids.

Morphinae Hydrochloras. $C_{17}H_{19}NO_3 \cdot HCl \cdot 3H_2O$.

From **Opium** (p. 59), by a method detailed on p. 71.

Silky acicular prisms.

Soluble in 24 parts of water, 90 of Rectified Spirit.

Morphinae Sulphas. *Sulphate of Morphine.* $(C_{17}H_{19}NO_3)_2 \cdot H_2SO_4 \cdot 5H_2O$.

From **Opium**, by a similar method (p. 71).

Crystallizes out on cooling: silky acicular crystals.

Soluble in 24 parts of water, sparingly in spirit.

Morphinae Acetas. $C_{17}H_{19}NO_3 \cdot C_2H_4O_2$.

From **Morphinae Hydrochloras**, by precipitating Morphine from its solution by means of Ammonia, and dissolving in diluted Acetic Acid.

Evaporated to dryness. Amorphous powder.

Soluble in 6 parts of water, 100 of Rectified Spirit.

Liquor Morphinae Bimeconatis. $(C_{17}H_{19}NO_3 \cdot C_7H_4O_7)$

From Morphine, prepared as above, by dissolving in diluted spirit with Meconic Acid.

Colourless. Contains about $\frac{11}{16}$ gr. in the drachm.

Physostigmina. *Physostigmine* or *Eserine.* $C_{15}H_{21}N_3O_2$.

From *Extractum Physostigmatis* (p. 42) by dissolving it in water, and precipitating the alkaloid with Bicarbonate of Sodium. On shaking the mixture with ether, the alkaloid is taken up, and is recovered by decanting the ethereal solution and evaporating.

Pinkish crystals.

Slightly soluble in water; more so in alcohol and diluted acids.

Pilocarpinae Nitras. *Nitrate of Pilocarpine.* $C_{11}H_{16}N_2O_2 \cdot HNO_3$.

From *Extractum Jaborandi* (p. 28), by shaking it with alkali and chloroform, separating and evaporating the chloroformic solution, and neutralising the resulting alkaloid with Nitric Acid.

Purified by re-crystallization. Acicular crystals or crystalline powder.

Soluble in 8 or 9 parts of water. Slightly soluble in cold, freely soluble in hot Rectified Spirit.

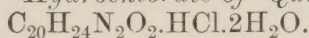
Quininae Sulphas. *Sulphate of Quinine.* $2(C_{20}H_{24}N_2O_2)_2 \cdot H_2SO_4 \cdot 15H_2O$.

From various kinds of Cinchona and Remijia bark, by extracting Quinine with spirit after the addition of lime, or by precipitating Quinine from an infusion made with acidulated water, neutralizing the Quinine with Sulphuric Acid, and purifying the resulting salt.

Feathery crystals.

Soluble in 40 parts of Rectified Spirit, 800 of water.

With 1 minim of *Ac. Sulphuric. Dil.*, *Ac. Phosphor. Dil.*, or less of *Ac. Nitric. Dil.* to each grain, it is soluble in 8 parts of water.

Quininæ Hydrochloras. *Hydrochlorate of Quinine.*

From the same sources, by a similar process, using Hydrochloric instead of Sulphuric Acid.

Similar, but larger crystals.

Soluble in 34 parts of cold water, 3 parts of Rectified Spirit; much more soluble in boiling water or spirit.

Strychnina. *Strychnine.* $\text{C}_{21}\text{H}_{22}\text{N}_2\text{O}_2$.

From **Nux Vomica** (p. 41), by a method detailed on p. 72.

Prisms or octahedra.

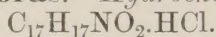
Soluble in 6,000 parts of water, not in cold absolute alcohol.

Veratrina. *Veratrine.* $\text{C}_{32}\text{H}_{52}\text{N}_2\text{O}_8$ (*not quite pure*).

From **Sabadilla**. (p. 39), by a method detailed on p. 72.

Amorphous masses; pale grey.

Soluble in 11 parts of Rectified Spirit; insoluble in cold water.

Apomorphinæ Hydrochloras. *Hydrochlorate of Apomorphine.*

Not a salt of a natural alkaloid, but obtained by heating Morphine or Codeine to 300° F. in sealed tubes with excess of Hydrochloric Acid.

Minute acicular crystals, turning green on exposure to air and moisture.

Soluble in 7 parts of water, and 50 parts of alcohol. Decomposed on boiling.

OFFICINAL PREPARATIONS.

Liquor Atropinæ Sulphatis.**Liquor Strychninæ Hydrochloratis.****Liquor Morphinæ Acetatis.****Liquor Morphinæ Hydrochloratis.**

All contain .55 grain in a drachm, or .009 grain in 1 minim.

Liq. Atropinæ Sulphatis is a solution in Camphor Water.

The menstrua of the other liquors contain alcohol, one-third being Rectified Spirit. This is necessary to preserve the alkaloids from decomposition.

A little dilute Hydrochloric Acid is added to procure solution of the Strychnine, which enters into a hydrochlorate.

A little dilute Acetic and dilute Hydrochloric Acids are added in making *Liq. Morph. Acetatis* and *Liq. Morph. Hydrochloratis* respectively, to supply the place of the acid which is sometimes lost in drying the prepared salts. Morphine by itself is insoluble in water.

Liquor Morphinæ Bimeconatis. See above.

Contains about $\frac{11}{16}$ gr. in the drachm.

Injectio Apomorphinæ Hypodermica. A solution in Camphor Water. $\frac{1}{60}$ gr. in each minim.

Injectio Morphinæ Hypodermica. A solution of Acetate of Morphine in water, with a very slight excess of Acetic Acid. $\frac{1}{10}$ grain in each minim.

The solution is not made from *Morphinæ Acetas*, which, as stated above, is liable to partial decomposition. Morphine is freshly precipitated by Ammonia from *Morph. Hydrochloras*, carefully dissolved in Acetic Acid, and diluted.

Tinctura Chloroformi et Morphinæ. A substitute for "Chlorodyne." Contains in each 10 minims (full dose):—

Chloroform, $1\frac{1}{2}$ min.

Hydrochl. of Morphine, $\frac{1}{48}$ gr.

Dilute Hydrocyanic Acid, $\frac{5}{8}$ min.

Ether, $\frac{1}{8}$ min.

With Rect. Spirit, Treacle, Syrup, and Liquid Extract of Liquorice; flavoured with Oil of Peppermint.

Tinctura Quininæ. A solution of Hydrochlorate of Quinine in *Tinct. Aurantii*, 1 grain in each drachm; strained from Gallate of Quinine (see p. 35).

Tinctura Quininæ Ammoniata. A solution in proof spirit, with the same amount of Quinine as the plain tincture, and $7\frac{1}{2}$ min of *Liq. Ammoniac* in the drachm.

Vinum Quininæ. A solution of Sulphate of Quinine in Orange Wine, acidulated with Citric Acid; 1 gr. in each fluid ounce.

Lamellæ Atropinæ. Each contains $\frac{1}{8000}$ gr. of Sulphate of Atropine.

Lamellæ Cocainæ. Each contains $\frac{1}{8000}$ gr. of Hydrochlorate of Cocaine.

Lamellæ Physostigminæ. Each contains $\frac{1}{10000}$ gr. of Physostigmine.

Suppositoria Morphinæ. $\frac{1}{2}$ gr. of the Hydrochlorate in each suppository.

Suppositoria Morphinæ cum Sapone. The same amount of the Hydrochlorate.

Trochisci Morphinæ. $\frac{1}{30}$ gr. of the Hydrochlorate in each; flavoured with Tolu.

Trochisci Morphinæ et Ipecacuanhæ. The same, with $\frac{1}{12}$ gr. of Ipecacuanha.

Unguentum Aconitinæ.

Unguentum Atropinæ.

Unguentum Veratrinæ.

} With 8 grs. of the Alkaloid in the ounce.

Quinine is also officinal in the form of Ferri et Quiniae Citras. See Sect. III.

THE PHARMACOPŒIA PRESCRIBES, OR DESCRIBES IN DETAIL, THE FOLLOWING PROCESSES FOR THE EXTRACTION OF SOME OF THE ALKALOIDS AND NEUTRAL PRINCIPLES.

Aconitina.

1.—Powdered ACONITE ROOT (p. 30).

An extract made with Rectified Spirit by boiling and maceration for four days, percolation and evaporation.

The extract exhausted by boiling distilled water.

An infusion containing salts of Aconitine.

2.—The Infusion filtered.

Liquor Ammoniaë added in slight excess, and the whole heated over a water bath.

Impure Aconitine precipitated.

3.—The precipitate collected, dried, and powdered.

An extract made of it by means of ether.

Contains little but pure Aconitine.

The extract dissolved in warm water, acidulated with sulphuric acid.

A solution of Sulphate of Aconitine.

4.—Liquor Ammoniaë, diluted with four times its bulk of water, added cautiously.

Aconitina precipitated.

Washed and dried.

Atropina.

1.—Powdered BELLADONNA ROOT (p. 30).

Exhausted with Rectified Spirit.

A Tincture containing salts of Atropine, with colouring and resinous matters, etc.

2.—Lime added, and the tincture shaken.

Colouring matters precipitated.

The solution filtered.

The excess of lime neutralised by Dilute Sulphuric Acid in slight excess.

The tincture now contains salts of Atropine, resins, free Sulphuric Acid, and Calcium Sulphate.

3.—Three-fourths of the alcohol distilled off (to avoid waste).

Water added, and the solution gently heated, till the rest of the alcohol has passed off.

A watery solution of the above substances

A solution of Potassium Carbonate added nearly to neutrality.
Allowed to stand six hours.

Resins precipitated.

The same added to alkalinity.

Atropine precipitated.

4.—The liquid and precipitate shaken up with chloroform.

*A chloroformic tincture of
Atropine.*

*A solution of Calcium and
Potassium Salts.*

5.—The chloroformic tincture allowed to subside, and drawn off.

The chloroform distilled off.

The residue of Atropine re-dissolved in Rectified Spirit.

Digested with Animal Charcoal.

Decolorized.

The solution filtered.

On evaporation, **Atropina** crystallizes out.

Beberinae Sulphas.

1.—Powdered BEBEERU BARK (p. 26).

Exhausted with diluted Sulphuric Acid (1 in 320).

A solution of Sulphate of Beberine, colouring matters, etc.

2.—Concentrated, and cooled.

Milk of Lime added, but *not* to neutrality.

Allowed to stand for two hours.

Colouring matters precipitated.

3.—The solution filtered, the precipitate being washed.

Liquor Ammoniae added to alkalinity.

Beberine precipitated in an impure state.

4.—The precipitate collected, washed, squeezed, dried, and powdered.

Exhausted by boiling in Rectified Spirit.

A tincture of nearly pure Beberine.

5.—Water added and the spirit distilled off (to avoid waste).

A watery solution of nearly pure Beberine.

Dilute Sulphuric Acid added to slight acidity.

A solution of nearly pure Sulphate of Beberine.

6.—Evaporated to dryness, and powdered.

Dissolved in cold water.

Filtered.

A solution of pure Sulphate of Beberine

Evaporated to the consistence of a syrup.

Dried at 140° F. on glass plates.

Beberinae Sulphas, in garnet-coloured scales.

Morphinæ Hydrochloras, Morphinæ Sulphas.

1.—OPIUM (p. 59).

Exhausted by prolonged maceration in cold water.

An infusion containing Morphine and Codeine as Meconates and Sulphates, with resins, extractive matter, etc.

2.—Concentrated till each pint represents a pound of Opium, and strained.

A solution of Calcium Chloride added.

Hydrochlorates of Morphine and Calcium Meconate and Sulphate Codeine formed, and remain formed and precipitated, with dissolved. the resins.

3.—The whole evaporated till it solidifies on cooling.

The solid mass wrapped in calico and subjected to powerful pressure.

Dark liquid exudes, containing colouring matter, etc., with a small amount of alkaloid.

4.—The mass exhausted with boiling water, and the resulting solution filtered.

A solution of the Hydrochlorates of Morphine and Codeine, with colouring matter, etc.

5.—The solution evaporated till it solidifies on cooling.

Compressed as before.

More dark liquid exudes.

6.—Exhausted again.

7.—Processes Nos. 5 and 6 repeated till a nearly colourless solution is obtained.

The solution digested with Purified Animal Charcoal for 20 minutes.

Filtered, the charcoal being washed on the filter with boiling water.

A decolorised solution.

Liquor Ammoniae added in slight excess.

Codeine remains in solution, with Ammonium Chloride.

Morphine precipitated.

Collected.

Washed free from Codeine and Chloride, *i.e.*, till the washings cease to precipitate with a solution of nitrate of silver acidulated by nitric acid.

Diffused in boiling water.

Hydrochloric, or Sulphuric, Acid carefully added till all is dissolved.

A solution of pure Hydrochlorate, or Sulphate, of Morphine.

On cooling, **Morphinæ Hydrochloras**, or **M. Sulphas**, crystallizes out.

More obtained on concentrating the mother liquor.

Strychnina.

- 1.—**NUX VOMICA** seeds (p. 41) softened by heating, and ground.
Exhausted by prolonged digestion with Rectified Spirit, diluted with half its bulk of water.
A tincture of Salts of Strychnine and Brucine, with colouring matter, etc.
- 2.—The spirit distilled off (to avoid waste).
The remaining watery solution concentrated, and filtered when cold.
A solution of Lead Acetate added, as long as a precipitate is formed.
Colouring matter, etc., precipitated.
- 3.—The solution filtered, the filter being washed.
Concentrated.
Liquor Ammoniaë added, with stirring.
Allowed to stand for twelve hours.
Strychnine and Brucine precipitated, with other matters.
- 4.—The precipitate collected, washed, and dried.
Exhausted by boiling with Rectified Spirit, as long as any bitter matter is yielded.
A spirituous solution of Strychnine and Brucine.
- 5.—Most of the spirit distilled off (to avoid waste).
A watery solution of the same.
The remainder concentrated and cooled.
Brucine remains in the mother liquor. Strychnine and a little Brucine crystallize out as a white crust.
- 6.—The crust washed on a filter with Rectified Spirit diluted with half its bulk of water, as long as Brucine is yielded, *i.e.*, as long as the washings redden with Nitric Acid.
The residue dissolved in boiling Rectified Spirit.
On cooling, **Strychnina** crystallizes out.
More procured by evaporating the mother liquor.

Veratrina.

- 1.—**CEVADILLA SEEDS** (p. 39) husked and ground.
Exhausted with Rectified Spirit.
A tincture containing Gallate of Veratrine, resins, etc.
- 2.—Concentrated as long as no deposit forms.
Poured into cold water.
Resins precipitated.

- 3.—Filtered, the precipitate being washed.
Liquor Ammonia added in slight excess.
Ammonium Gallate remains in solution. Veratrine precipitated, with impurities.
- 4.—The precipitate collected and washed.
Diffused in water.
Hydrochloric Acid added till all is dissolved.
A solution of impure Hydrochlorate of Veratrine.
- 5.—Digested with Purified Animal Charcoal at a gentle heat.
Decolorised.
Filtered and cooled.
Liquor Ammonia added.
Purer Veratrine precipitated.
- 6.—The precipitate washed till the washings are free from Chloride.
Dried at a gentle heat,—**Veratrina.**

Santoninum.

- 1.—SANTONICA (p. 23).
Boiled with Lime; the fluid strained and expressed.
A solution containing Santonin and oily matters in combination with Lime.
- 2.—Concentrated.
While hot, Hydrochloric Acid added, with stirring, to acidity.
Allowed to stand five days.
Oil separates on the surface of the fluid. Santonin precipitated.
- 3.—The oil skimmed off,
and the fluid decanted.
- 4.—The precipitate collected, and washed from acid and colouring matter.
Washed with diluted *Liq. Ammonia*.
Washed again with water till free from colouring matter.
Expressed and dried.
- 5.—Re-dissolved in boiling Rectified Spirit.
Digested with Animal Charcoal. Boiled.
Filtered. The filter washed with boiling spirit.
Allowed to stand two days in a cool dark place.
Santoninum *crystallizes out.*
Purified by recrystallization.
Dried in the dark and kept from light.

BOTANICAL SYNOPSIS OF THE NATURAL ORDERS AND PLANTS FURNISHING OFFICINAL DRUGS.

WITH THEIR GEOGRAPHICAL SOURCES, AND THEIR PREPARATIONS.

DICOTYLEDONES.

(THALAMIFLORÆ.)

RANUNCULACEÆ.

1. *Aconitum Napellus*. *Monkshood*. Native.
Aconiti Folia (p. 27). Extr.
Aconiti Radix (p. 30). Tr., Lin.
Aconitina (p. 64). Ung.
2. *Cimicifuga Racemosa*. *Black Snake Root*. N. America.
Cimicifuga Rhizoma (p. 30). Extr. liq., Tr.
3. *Podophyllum Peltatum*.* *American May Apple*. United States.
Podophylli Rhizoma (p. 31).
Podophylli Resina, *Podophyllin* (p. 50). Tr.
4. *Delphinium Staphisagria*. *Stavesacre*. Native.
Staphisagriae Semina (p. 41). Ung.

MAGNOLIACEÆ.

5. *Illicium Anisatum*. *Star Anise*. China.
Anisi Stellati Fructus (p. 37).
Oleum Anisi (p. 47. See No. 71.) Ess.

MENISPERMACEÆ.

6. *Jateorhiza Calumba*. *Calumba*. E. Africa.
Calumbæ Radix (p. 30). Extr., Inf., Tr.
7. *Chondrodendron Tomentosum*. Brazil.
Pareiræ Radix (p. 31). Extr., Extr. liq., Dec.

* Placed by Bentley in Order *Berberidacæ*.

PAPAVERACEÆ.

8. *Papaver Somniferum*. *Garden Poppy*. α . Native. β . Asia Minor.
 α . **Papaveris Capsulæ** (p. 38). Extr., Dec., Syr.
 β . **Opium** (p. 59).
Morphinæ Acetas (p. 66). Liq., Inj. M. hypod.
Morphinæ Bimeconas (p. 66). Liq.
Morphinæ Hydrochloras (p. 66). Liq., Troch., Troch. M. c. Ipec.,
 Supp., Tr. Chlorof. et M.
Morphinæ Sulphas (p. 66).
Codeina (p. 66).
Acidum Meconicum (p. 63).
Apomorphinæ Hydrochloras (p. 67). Inj. hypod.
9. *Papaver Rhœas*. *Red Poppy*. Native.
Rhœados Petala (p. 22). Syr.

CRUCIFERÆ.

10. *Cochlearia Armoracia*. *Horse Radish*. Native.
Armoraciæ Radix (p. 30). Sp. Co.
11. *Brassica Alba*. *White Mustard*. Native.
Sinapis Albæ Semina (p. 41).
12. *Brassica Nigra*. *Black Mustard*. Native.
Sinapis Nigræ Semina (p. 41).
From both the above—
Sinapis. Cat., Chart.
Ol. Sinapis (p. 48). Lin. co.

POLYGALACEÆ.

13. *Krameria Triandra*. *Peruvian Rhatany*; and *Krameria Ixina*.
Savanilla Rhatany. Peru and Chili.
Krameria Radix (p. 31). Extr., Inf., Tr.
14. *Polygala Senega*. *Senega*. United States.
Senegæ Radix (p. 32). Inf., Tr.

ERYTHROXYLACEÆ.

15. *Erythroxylon Coca*. *Cuca*. Peru.
Coca (p. 27). Extr. liq.
Cocainæ Hydrochloras (p. 65). Lam.

LINACEÆ.

16. *Linum Usitatissimum*. *Flax*. Native.
Lini Semina, *Linseed* (p. 41). Inf.
Lini Farina, *Linseed-meal* (p. 41). Cat.
Oleum Lini (p. 43).

MALVACEÆ.

17. *Gossypium Barbadense*, and other species. *Cotton*. N. America ; India.

Gossypium, *Cotton Wool* (p. 42). See Pyroxylin, in Sect. III.

STERCULIACEÆ.

18. *Cola Acuminata*. *Kola Nut Tree*. Africa.

Caffeina (p. 65, see Nos. 24 & 81).

Caffeinæ Citras (p. 65, see Nos. 24 and 81).

BYTTNERIACEÆ.

19. *Theobroma Cacao*.

Oleum Theobromatis, *Cocoa Butter* (p. 44).

AURANTIACEÆ.

20. *Citrus Vulgaris*. *Bitter Orange*. S. Europe.

Aqua Aurantii Floris. From *Citrus Aurantium* as well (p. 22).
Syr.

Aurantii Cortex (peel, p. 35). Inf., Inf. co., Tr., Syr.

Aurantii Fructus (p. 35). Tr. Aur. Rec.

21. *Citrus Limonum*. *Lemon*. S. Europe.

Limonis Succus (p. 36). Syr. See *Acidum Citricum* in Sect. III.

Limonis Cortex (p. 36). Tr.

Oleum Limonis (p. 46).

22. *Egle Marmelos*. *Bael*. Malabar.

Belæ Fructus (p. 37). Extr. liq.

CANELLACEÆ.

23. *Canella Alba*. W. Indies.

Canellæ Albæ Cortex (p. 25).

CAMELLIACEÆ.

24. *Camellia Thea*. *Tea-plant*. China ; India.

Caffeina (p. 65, see Nos. 18 and 81).

Caffeinæ Citras (p. 65, see Nos. 18 and 81).

GUTTIFERÆ.

25. *Garcinia Hanburii*. *Gamboge*. Siam.

Cambogia (p. 54). Pil. co.

VITACEÆ.

26. *Vitis Vinifera*. *Vine*. Spain.

Uvæ, *Raisins* (p. 36).

See Alcohol, Pot. Tart. Acid., Ac. Tartaricum, in Sect. III.

ZYGOPHYLLACEÆ.

27. Guaiacum Officinale and Sanctum. *Lignum Vitæ*. W. Indies.

Guaiaci Lignum (p. 24).

Guaiaci Resina (p. 49). Mist., Tr. ammon.

RUTACEÆ.

28. Barosma Betulina }
 Barosma Crenulata } *Bucco*. Cape.
 Barosma Serratifolia }

Buchu Folia (p. 27). Inf., Tr.

29. Galipea Cusparia. *Angustura Bark Tree*. S. America.

Cuspariæ Cortex (p. 25). Inf.

30. Pilocarpus Pennatifolius. *Jaborandi*. S. America.

Jaborandi (p. 28). Extr., Inf., Tr.

Pilocarpinæ Nitræ (p. 66).

31. Ruta Graveolens. *Rue*. Native.

Oleum Rutæ (p. 48).

SIMARUBACEÆ.

32. Picræna Excelsa. *Quassia*. Jamaica.

Quassiæ Lignum (p. 24). Extr., Inf., Tr.

(CALYCIFLORÆ.)

RHAMNACEÆ.

33. Rhamnus Frangula. *Black Alder*. Native.

Rhamni Frangulæ Cortex (p. 26). Extr., Extr. liq.

34. Rhamnus Purshianus. *Cascara Sagrada*. California.

Rhamni Purshiani Cortex (p. 26). Extr., Extr. liq. (*Cascaræ Sagradæ*).

ANACARDIACEÆ.

35. Pistacia Lentiscus. *Mastic*. Levant.

Mastiche (p. 49).

AMYRIDACEÆ.

36. Canarium Commune (?) Manila.

Elemi (p. 51). Ung.

37. Balsamodendron Myrrha. *Myrrh*. Arabia.

Myrrha (p. 54). Tr., Pil. Aloes et M.

LEGUMINOSÆ.

38. *Acacia Senegal*, and other species. E. Africa.
Acaciæ Gummi (p. 53). Muc.
39. *Myroxylon Pereiræ*. C. America.
Balsamum Peruvianum (p. 52).
40. *Myroxylon Toluifera*. C. America.
Balsamum Tolutanum (p. 52). Syr., Tr.
41. *Cassia Fistula*. *Pudding-pipe Tree*. E. & W. Indies.
Cassiæ Pulpa (p. 37).
42. *Andira Araroba*. Bahia.
Chrysarobinum, *Goa powder* (p. 58). Ung.
43. *Copaifera Langsdorffii*, and other species. *Copaiva Tree*. C. & S. America.
Copaiba (p. 51).
Oleum Copaibæ (p. 47).
44. *Glycyrrhiza Glabra*. *Liquorice*. Native.
Glycyrrhizæ Radix (p. 31). Extr., Extr. liq., Pulv. co.
45. *Hæmatoxylon Campechianum*. *Logwood*. E. & W. Indies.
Hæmatoxyli Lignum (p. 24). Extr., Dec.
46. *Pterocarpus Marsupium*. *Kino Tree*. Malabar.
Kino (p. 57). Pulv. co., Tr.
47. *Physostigma Venenosum*. *Calabar Bean*. W. Africa.
Physostigmatis Semen (p. 41). Extr.
Physostigmina (p. 66). Lam.
48. *Pterocarpus Santalinus*. *Red Sandal Wood Tree*. Ceylon; Coromandel.
Pterocarpi Lignum (p. 24).
49. *Cytisus Scoparius*. *Broom*. Native.
Scoparii Cacumina (p. 20). Succ., Dec.
50. *Cassia Acutifolia*. *Alexandrian Senna*. Source uncertain.
Senna Alexandrina (p. 28). Inf., Tr., Mist., Syr., Conf.
51. *Cassia Angustifolia*. *Tinnevelly or East Indian Senna*. India.
Senna Indica (p. 28). Same preparations.
52. *Tamarindus Indica*. *Tamarind*. E. & W. Indies.
Tamarindus (p. 39).
53. *Astragalus Gummifer*, and other species. *Milk Vetch*. Asia Minor.
Tragacantha (p. 53). Pulv. co., Muc., Glys.

ROSACEÆ.

54. *Prunus Amygdalus*.
var. amara. Bitter Almond. Morocco.
Amygdala Amara (p. 40).
Oleum Amygdalæ (p. 43).
55. *var. dulcis. Sweet or Jordan Almond. South Europe ; Syria.*
Amygdala Dulcis (p. 40). Pulv. co., Mist.
Oleum Amygdalæ (p. 43).
56. *Hagenia Abyssinica. Kousso. Abyssinia.*
Cusso (p. 21). Inf.
57. *Prunus Lauro-cerasus. Cherry Laurel. Native.*
Lauro-cerasi Folia (p. 23). Aq.
58. *Prunus Domestica. Plum Tree. S. of France.*
Prunum (p. 39).
59. *Rosa Canina. Dog Rose. Native.*
Rosæ Caninæ Fructus. Hips (p. 36). Conf.
60. *Rosa Centifolia. Cabbage Rose. Native.*
Rosæ Centifoliæ Petala (p. 22). Aq.
61. *Rosa Gallica. Red Rose. Native.*
Rosæ Gallicæ Petala (p. 22) Inf. ac., Syr., Conf.

MYRTACEÆ.

62. *Melaleuca Minor. Cajeput. Moluccas.*
Oleum Cajuputi (p. 47). Sp.
63. *Eugenia Caryophyllata. Clove. E. Indian Islands.*
Caryophyllum (p. 23). Inf.
Oleum Caryophylli (p. 46).
64. *Eucalyptus Globulus, Amygdalina, and probably other species. Blue Gum Tree. Tasmania ; Australia ; Algeria.*
Ol. Eucalypti (p. 47). Ung., Vap.
65. *Punica Granatum. Pomegranate. Mediterranean Coast.*
Granati Radicis Cortex (p. 26). Dec.
66. *Pimenta Officinalis. All-spice. W. Indies.*
Pimenta (p. 36). Aq.
Oleum Pimentæ (p. 46).

CUCURBITACEÆ.

67. *Citrullus Colocynthis. Colocynth. India ; Levant.*
Colocynthisidis Pulpa (p. 33). Extr. co., Pil. co., Pil. C. et Hyosc.

68. *Ecballium Elaterium*. *Squirting Cucumber*. S. Europe.

Ecballii Fructus (p. 38).

Elaterium (p. 58).

Elaterinum (p. 64). Pulv. co.

UMBELLIFERÆ.

69. *Dorema Ammoniacum*. *Punjaub and Persia*.

Ammoniacum (p. 54). Mist., Emp. A. c. Hydrarg.

70. *Peucedanum Graveolens*. *Dill*. Native.

Anethi Fructus (p. 35). Aq.

Oleum Anethi (p. 46).

71. *Pimpinella Anisum*. *Anise*. China.

Anisi Fructus (p. 37). Aq.

Oleum Anisi (p. 47, see No. 5). Ess.

72. *Ferula Narthex*, *F. Scorodosma*, and other species. *Punjaub and Persia*.

Asafoetida (p. 54). Tr., Pil. co., En., Sp. Amm. Fœtidus., Pil. Al. et Asaf.

73. *Carum Carui*. *Caraway*. Native.

Carui Fructus (p. 36). Aq.

Oleum Carui (p. 46).

74. *Conium Maculatum*. *Hemlock*. Native.

Conii Folia (p. 27). Extr., Pil. co., Succ., Cat., (Vap. Coninæ).

Conii Fructus (p. 38). Tr.

Conina (p. 29). Vap.

75. *Coriandrum Sativum*. *Coriander*. Native.

Coriandri Fructus (p. 36).

Oleum Coriandri (p. 46).

76. *Fœniculum Capillaceum*. *Fennel*. Europe.

Fœniculi Fructus (p. 36). Aq.

77. *Ferula Galbaniflua*, *F. Rubricaulis*, and other species. *India; Levant*.

Galbanum (p. 54). Emp.

78. *Ferula Sumbul*. *Musk Root*. Central Asia.

Sumbul Radix (p. 32). Tr.

79. *Carum Ajowan*. *India*.

Thymol (p. 62, see Nos. 118 and 119).

(COROLLIFLORÆ.)

CAPRIFOLIACEÆ.

80. *Sambucus Nigra*. *Elder*. Native.

Sambuci Flores (p. 22). Aq.

RUBIACEÆ.*

81. *Coffea Arabica*. *Coffee-plant*. Ceylon, Java, India, &c.
Caffeina (p. 65, see Nos. 18 and 24).
Caffeinae Citras (p. 65, see Nos. 18 and 24).
82. *Uncaria Gambier*. Singapore.
Catechu (p. 57). Pulv. co., Inf., Tr., Troch.
83. *Cinchona Succirubra*. *Red Cinchona*. Chimborazo.
Cinchonæ Rubræ Cortex (p. 25). Extr. liq., Inf. ac., Dec., Tr.,
 Tr. co.
84. *Cinchona Calisaya*, *Officinalis*, *Lancifolia*, *Succirubra*, and other species
 from which the *Cinchona* alkaloids can be obtained (p. 25). Bolivia,
 Peru, Ecuador, Himalayas, &c.
Cinchonæ Cortex (p. 25).
Cinchonidinae Sulphas (p. 65).
- The above, and also several species of
85. *Remijia*.
Quininæ Sulphas (p. 66). Tr. ammon., Vin.
Quininæ Hydrochloras (p. 67). Tr.,
Cinchoninæ Sulphas (p. 65).
86. *Cephaëlis Ipecacuanha*. *Ipecacuanha*. Brazil.
Ipecacuanha (p. 31). Pulv. co., Pil. Ip. c. Sc., Vin., Troch., Troch.
 Morph. c. Ipec.

VALERIANACEÆ.

87. *Valeriana Officinalis*. *Valerian*. Native.
Valerianæ Rhizoma (p. 32). Inf., Tr., Tr. amm.

COMPOSITÆ.

88. *Anthemis Nobilis*. *Chamomile*. Native.
Anthemidis Flores (p. 22). Extr., Inf.
Oleum Anthemidis (p. 47).
89. *Arnica Montana*. Europe.
Arnicæ Rhizoma (p. 30). Tr.
90. *Lactuca Virosa*. *Wild Lettuce*. Native.
Lactuca (p. 20). Extr.
91. *Anacyclus Pyrethrum*. *Pellitory*. Morocco; Spain; Levant.
Pyrethri Radix (p. 31). Tr.
92. *Artemisia Maritima*, *var. Stechmanniana*. Russia.
Santonica, *Worm-seed* (p. 23).
Santoninum (p. 64). Troch.
93. *Taraxacum Officinale*. *Dandelion*. Native.
Taraxaci Radix (p. 32). Extr., Extr. liq., Succ., Dec.

* Nos. 81-86 fall in the separate order of *Cinchonaceæ* made by some botanists.

LOBELIACEÆ.

94. *Lobelia Inflata*. *Indian Tobacco*. United States.

Lobelia (p. 20). Tr., Tr. ætherea.

ERICACEÆ.

95. *Arctostaphylos Uva-Ursi*. *Bearberry*. Europe.

Uvæ Ursi Folia (p. 28). Inf.

SAPOTACEÆ.

96. *Dichopsis Gutta*. *Gutta Percha Tree*. Eastern Archipelago.

Gutta-Percha (p. 58). Liq.

STYRACACEÆ.

97. *Styrax Benzoin*. *Benjamin Tree*. Eastern Archipelago.

Benzoinum (p. 52). Tr. co.

Acidum Benzoicum (p. 63). Adeps benzoatus.

OLEACEÆ.

98. *Olea Europæa*. *Olive*. S. Europe.

Oleum Olivæ (p. 82).

99. *Fraxinus Ornus*. Sicily.

Manna (p. 58).

ASCLEPIADACEÆ.

100. *Hemidesmus Indicus*. *Indian Sarsaparilla*. India.

Hemidesmi Radix (p. 31). Syr.

LOGANIACEÆ.

101. *Gelsemium Nitidum*. *Yellow Jasmine*. Southern States.

Gelsemium (p. 31). Extr. alcohol., Tr.

102. *Strychnos Nux-Vomica*. *Koochla Tree*. India.

Nux Vomica (p. 41). Extr., Tr.

Strychnina (p. 67). Liq. Str. Hydrochlor.

GENTIANACEÆ.

103. *Ophelia Chirata*. *Chiretta*. India.

Chirata (p. 20). Inf., Tr.

104. *Gentiana Lutea*. *Gentian*. European Mountains.

Gentianæ Radix (p. 1). Extr., Inf. co., Tr. co.

CONVOLVULACEÆ.

- 105.
- Ipomœa Purga*
- .
- Jalap*
- . Mexico.

Jalapa (p. 31). Extr., Pulv. co., Tr.**Jalapæ Resina** (p. 49).

- 106.
- Convolvulus Scammonia*
- .
- Scammony*
- . Asia Minor.

Scammoniae Radix (p. 32).**Scammoniae Resina** (p. 50). Pil. co., Pulv. co., Conf.**Scammonium** (p. 54). Mist.SOLANACEÆ. *Sub-order Solaneæ*.

- 107.
- Capsicum Fastigiatum*
- . Zanzibar.

Capsici Fructus (p. 37). Tr.*Sub-order Atropeæ* (Ord. ATROPACEÆ of some botanists).

- 108.
- Atropa Belladonna*
- .
- Deadly Nightshade*
- . Native.

Belladonnæ Folia (p. 27). Extr., Succ., Tr.**Belladonnæ Radix** (p. 30). Extr. alcoh., Lin., Ung., Emp.**Atropina** (p. 64). Ung.**Atropinæ Sulphas** (p. 64). Liq., Lam.

- 109.
- Hyoscyamus Niger*
- .
- Henbane*
- . Native.

Hyoscyami Folia (p. 28). Extr., Succ., Tr.

- 110.
- Datura Stramonium*
- .
- Thorn Apple*
- . Native.

Stramonii Semina (p. 41). Extr., Tr.

- 111.
- Nicotiana Tabacum*
- .
- Tobacco*
- . Virginia, West Indies, Asia Minor, &c.

Tabaci Folia (p. 28).

SCROPHULARIACEÆ.

- 112.
- Digitalis Purpurea*
- .
- Foxglove*
- . Native.

Digitalis Folia (p. 28). Inf., Tr.

LABIATÆ.

- 113.
- Lavandula Vera*
- .
- Lavender*
- . Native.

Oleum Lavandulæ (p. 46). Sp., Tr. co.

- 114.
- Mentha Piperita*
- .
- Peppermint*
- . Native.

Oleum Menthæ Piperitæ (p. 46). Aq., Ess., Sp.

- 115.
- Mentha Viridis*
- .
- Spearmint*
- . Native.

Oleum Menthæ Viridis (p. 46). Aq.

- 116.
- Mentha Arvensis*
- ,
- vars.*
- piperascens*
- et
- glabrata*
- . China and Japan.

Menthol (p. 62).

- 117.
- Rosmarinus Officinalis*
- .
- Rosemary*
- . S. Europe.

Oleum Rosmarini (p. 46). Sp.

118. *Thymus Vulgaris*. *Thyme*. Native. }
 119. *Monarda Punctata*. *Horsemint*. N. America. }
Thymol (p. 62. See No. 79).

(MONOCHLAMYDEÆ.)

POLYGONACEÆ.

120. *Rheum Palmatum*, *Rh. Officinale*, and probably other species.
Rhubarb. China and Thibet.
Rhei Radix (p. 31). Extr., Inf., Tr., Vin., Pil. co., Pulv. co., Syr.

THYMELACEÆ.

121. *Daphne Mezereum*, or *D. Laureola*. *Spurge Laurel*. Native.
Mezerei Cortex (p. 26). Extr. æther.

MYRISTICACEÆ.

122. *Myristica Fragrans*. *Nutmeg*. Eastern Archipelago.
Myristica (p. 41).
Oleum Myristicæ (p. 46). Sp.
Oleum Myristicæ Expressum, *Nutmeg-butter* (p. 43).

LAURACEÆ.

123. *Cinnamomum Camphora*. *Camphor Plant*. China; Japan.
Camphora (p. 62). Aq., Sp., Tr. co., Lin., Lin. co.
 124. *Cinnamomum Zeylanicum*. *Cinnamon*. Ceylon.
Cinnamomi Cortex (p. 25). Pulv. co., Aq., Tr.
Oleum Cinnamomi (p. 46).
 125. *Nectandra Rodiæi*. *Bebeeru*, or *Green-heart Tree*. Guiana.
Nectandrae Cortex (p. 26).
Beberinæ Sulphas (p. 65).
 126. *Sassafras Officinale*. N. America.
Sassafras Radix (p. 32).

SANTALACEÆ.

127. *Santalum Album*. *Sandal Wood*. India.
Oleum Santali (p. 48).

ARISTOLOCHIACEÆ.

128. *Aristolochia Serpentaria*, or *A. Reticulata*. *Serpentary*. Virginia.
Serpentariæ Rhizoma (p. 32). Inf., Tr.

EUPHORBIACEÆ.

129. *Croton Eluteria*. *Cascarilla*. Bahamas.
Cascarillæ Cortex (p. 25). Inf., Tr.
130. *Croton Tiglium*. *Croton-oil Plant*. India.
Oleum Crotonis (p. 43). Lin.
131. *Mallotus Philippinensis*. India.
Kamala (p. 38).
132. *Ricinus Communis*. *Castor-oil Plant*. India.
Oleum Ricini (p. 43).

PIPERACEÆ.

133. *Piper Cubeba*. *Cubebæ*. Java.
Cubeba (p. 38). Tr.
Oleo-resina Cubebæ (p. 51).
Oleum Cubebæ (p. 47).
134. *Piper Angustifolium*. *Matico*. Peru.
Maticæ Folia (p. 28). Inf.
135. *Piper Nigrum*. *Black Pepper*. India.
Piper Nigrum (p. 39). Conf.

MORACEÆ.

136. *Morus Nigra*. *Mulberry*. Native.
Mori Succus (p. 36). Syr.
137. *Ficus Carica*. *Fig Tree*. Asia Minor.
Ficus (p. 38).

CANNABINACEÆ.

138. *Cannabis Sativa*. *Indian Hemp; Bhang*. India.
Cannabis Indica (p. 21). Extr., Tr.
139. *Humulus Lupulus*. *Hop*. Native.
Lupulus (p. 21). Extr., Inf., Tr.
Lupulinum (p. 38).

CUPULIFERÆ.

140. *Quercus Robur*. *Oak*. Native.
Quercus Cortex (p. 26). Dec.
141. *Quercus Lusitanica*, var. *infectoria*. *Gall Oak*. Asia Minor.
Galla (p. 57). Tr., Ung., Ung. G. c. Opio.

LIQUIDAMBARACEÆ.

142. Liquidambar Orientalis. *Asia Minor*.
Styrax Præparatus (p. 52).

SALICACEÆ.

143. Populus, various species. *Poplar*. Native. }
 144. Salix Alba, and other species. *Willow*. Native. }
Salicinum (p. 63).

(GYMNOSPERMIA.)

CONIFERÆ.

145. Juniperus Communis. *Juniper*. N. Europe.
Oleum Juniperi (p. 47). Sp.
146. Juniperus Sabina. *Savin*. Native.
Sabinæ Cacumina (p. 20). Tr., Ung.
Oleum Sabinæ (p. 48).
147. Pinus Larix. *Larch*. Europe.
Laricis Cortex (p. 26). Tr.
148. Pinus Sylvestris. *Scotch Fir*. Norway, Scotland.
Oleum Pini Sylvestris, *Fir-wood Oil* (p. 47). Vap.
149. Pinus Picea. Switzerland.
Pix Burgundica (p. 49). Empl. Picis.
150. Pinus Balsamea. *Balm of Gilead Fir*. Canada.
Terebinthina Canadensis, *Canada Balsam* (p. 51).
151. Pinus Australis, and P. Tæda. America; France.
Thus Americanum, *Frankincense* (p. 51).
152. The same, also P. Pinaster and P. Sylvestris.
Oleum Terebinthinæ (p. 48). Conf., En., Ung., Lin., Lin. acet.
Resina (p. 50). Ung., Emp.

MONOCOTYLEDONES.

SMILACEÆ.

153. Smilax Officinalis. *Sarsaparilla*. Central America.
Sarsæ Radix, *Jamaica Sarsaparilla* (p. 32). Extr. liq., Dec., Dec. co.

ZINGIBERACEÆ.

154. *Elettaria Cardamomum*. *Cardamom*. Malabar.
Cardamomum (p. 40). Tr. co.

155. *Zingiber Officinale*. *Ginger*. E. & W. Indies.
Zingiber (p. 33). Tr., Tr. fort., Syr.

IRIDACEÆ.

156. *Crocus Sativus*. *Saffron*. S. Europe.
Crocus (p. 22). Tr.

LILIACEÆ.

157. *Aloe Vulgaris*. *Barbadoes Aloes*. Barbadoes.
Aloe Barbadosensis (p. 56). Extr., Pil., Pil. A. et Fer., En.

158. *Aloe Perryi*. Socotra. *Socotrine Aloes*.
Aloe Socotrina (p. 56). Extr., Dec. co., Tr., Vin., Pil., Pil. A. et Asaf.,
 Pil. A. et Myr., En.

From both the above.

Aloin (p. 64).

159. *Urginea Scilla*. *Squill*. S. Europe,
Scilla (p. 32). Tr., Acet., Oxym., Syr., Pil. co., Pil. Ipec. c. Sc.

MELANTHACEÆ.

160. *Colchicum Autumnale*. *Meadow Saffron*. Native,
Colchici Cormus (p. 30). Extr., Extr. acet., Vin.
Colchici Semina (p. 40). Tr.

161. *Schænocaulon Officinale*. *Cevadilla*. Mexico.
Sabadilla (p. 39).
Veratrina (p. 67). Ung.

162. *Veratrum Viride*. *Green Hellebore*. N. America.
Veratri Viridis Rhizoma (p. 33). Tr.

GRAMINACEÆ.

163. *Triticum Sativum*. *Wheat*.
Farina Triticæ, *Flour* (p. 40). Cat. Fermenti.

164. The same; also *Zea Mays*, *Maize*, and *Oryza Sativa*, *Rice*.
Amylum, *Starch* (p. 61). Muc., Glyc.

165. *Hordeum Distichon*. *Barley*. Native.
Hordeum Decorticatum, *Pearl Barley* (p. 40). Dec.

166. *Saccharum Officinarum*. *Sugar Cane*. W. Indies.
Saccharum Purificatum, *Refined Sugar* (p. 61) Syrupus
(Theriaca.)

FILICES.

167. *Aspidium Filix Mas*. *Male Fern.* Native.
Filix Mas (p. 30). Extr. liq.

FUNGI,

168. *Claviceps Purpurea*. *Ergot of Rye*. Native.
Ergota (p. 19). Extr. liq., Inf., Tr.
Ergotinum (p. 19). Inj. hypoderm.
169. *Saccharomyces Cerevisiæ*. *Yeast Plant*. Native.
Cerevisiæ Fermentum (p. 19). Cat.

LICHENES.

170. *Cetraria Islandica*. *Iceland Moss*. Iceland.
Cetraria (p. 19). Dec
-

SECTION III.

MINERALS AND PRODUCTS OF MANUFACTURE.

SIX GROUPS. 202 DRUGS.

- First Group Non-metallic Elements and their compounds, 13.
Second „ Mineral Acids, 9.
Third „ Alcohols and their derivatives, 15.
Fourth „ Organic Acids and Tar-products, 14.
Fifth „ Miscellanea, 7.
Sixth „ Metals and their compounds, 144.

The Official Preparations are described with each group.

FIRST GROUP, 13.

Aqua.	Sulphuris Iodidum.
Aqua Destillata.	Os Ustum.
Carbo Ligni.	Phosphorus.
Carbo Animalis.	Liquor Chlori.
Carbo Animalis Purificatus.	Bromum.
Sulphur Sublimatum.	Iodum.
Sulphur Præcipitatum.	

Aqua is the purest natural water that can be obtained, cleared if necessary by filtration.

Ten gallons of **Aqua** being distilled from a copper still with a block-tin worm; the first half-gallon that passes over may contain carbonic acid and ammonia. This is rejected. The next eight gallons are almost absolutely pure, and form **Aqua Destillata**. Distillation cannot be carried further without risk of contamination from charred organic matter.

Colourless, odourless, tasteless.

Carbo. Billets of Wood being heated to dull redness in cast-iron cylinders; water, gaseous and volatile matters are driven off, and **Carbo Ligni** (*Wood-Charcoal*), Carbon with about 2 p.c. of alkaline and metallic salts, remains.

Brittle porous masses, black.

Insoluble in any known liquid.

Capable of absorbing and condensing gases within its pores (90 times its own volume of Ammonia, 55 of Sulphuretted Hydrogen).

Also of absorbing organic colouring, odorous, and septic matters, and oxidizing them by means of the condensed atmospheric oxygen contained in its pores.

BONES being similarly treated, yield **Carbo Animalis**, *Bone-black*, a mixture of neutral Calcium Phosphate, $\text{Ca}_3(\text{PO}_4)_2$, and Calcium Carbonate, with about 20 p.c. of Carbon, and a little Iron Carbide. (See *Os Ustum*, p 91.)

Grey powder. Used as a filter in coarse processes.

On digesting **Carbo Animalis** with dilute Hydrochloric Acid, a solution of Calcium Chloride and Acid Calcium Phosphate, $\text{H}_4\text{Ca}(\text{PO}_4)_2$, is substituted for the insoluble carbonate and neutral phosphate. On filtering off the solution and washing the residue, **Carbo Animalis Purificatus**, almost pure Carbon, remains.

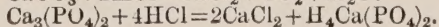
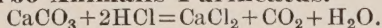
Dried by heating to redness in a covered vessel. Black Powder.

Similar properties to those of Wood-charcoal.

Power of decolorizing more marked.

Chiefly used as a filtering agent.

Carbo Animalis Purificatus.



Sulphur Sublimatum, *Flowers of Sulphur*, is commercial Sulphur purified by sublimation.

Gritty powder, pale yellow.

Soluble in Benzene, Carbon Disulphide, and Sulphur Chloride; with heat, in Turpentine and Oils.

Fuses at 236° F., volatilizes at 836° F.

Burns in air, forming *Sulphurous Anhydride*, SO_2 .

From Sulphur Sublimatum are obtained —

- 1. Sulphur Præcipitatum** (*Milk of Sulphur*), by boiling in water with slaked Lime, which yields a solution of Calcium Pentasulphide, CaS_5 , and Sulphosulphate, CaS_2O_3 ,* filtering the solution, and adding Hydrochloric Acid.

Sulphur is precipitated, and Calcium Chloride remains in solution.

Collected, washed, dried.

Pale yellow powder, not gritty.

Same properties as those of Sulphur Sublimatum.

- 2. Sulphuris Iodidum**, S_2I_2 , by heating, and finally fusing, with four times its weight of Iodine.

Allowed to solidify. Steel grey mass, crystalline.

Smells of Iodine.

Soluble in 60 parts of Glycerine.

Decomposed by boiling water.

Os Ustum (*Bone-ash*) is procured by burning either Bones, or Bone Black which has been used as a filtering agent, in the open fire.

Carbon is burnt off, and the earthy constituents only remain, viz., neutral Calcium Phosphate, $\text{Ca}_3(\text{PO}_4)_2$, and some Calcium Carbonate, both insoluble in water.

White powder.

From Os Ustum are obtained—

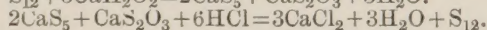
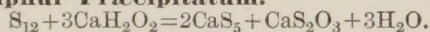
- 1. Calcii Phosphas.** (See *Calcium*.)

- 2. Phosphorus.** Sulphuric Acid is added, which converts the insoluble salts into the soluble Acid Phosphate of Calcium, $\text{H}_4\text{Ca}(\text{PO}_4)_2$, and a barely soluble sulphate.

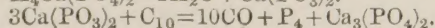
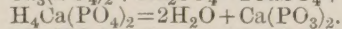
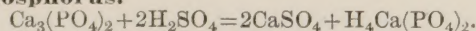
The Acid Phosphate is dissolved out with water, the solution evaporated to dryness, and the residue heated to redness. Hydrogen and oxygen are given off as water, and Calcium Metaphosphate remains, $\text{Ca}(\text{PO}_3)_2$.

* Or "Hyposulphite."

Sulphur Præcipitatum.



Phosphorus.



The Metaphosphate being heated with charcoal* in a retort, Carbonic Oxide and **Phosphorus** pass over, the residue being neutral Calcium Phosphate.

Condensed under water.

Wax-like, semi-transparent.

Becomes hard and brittle at low temperatures.

Soluble in Carbon Disulphide, Benzene, Oil of Turpentine, fixed and essential oils, slightly in Ether.

Fuses at 112° F. (may, therefore, be fused under water).

Burns in air, forming phosphoric anhydride, P_2O_5 . Burns slowly in air at all temperatures above freezing-point (must, therefore, be preserved under water).

Liquor Chlorig (*Chlorine Water*) is prepared by heating Hydrochloric Acid with Black Oxide of Manganese, and conducting the Chlorine thus evolved through a wash bottle into water until a solution of 2.66 grains to the ounce is formed.

Yellowish green, evolving Chlorine gas.

Chlorine decomposes many organic substances containing hydrogen by replacing that element; hence is destructive of vegetable colours and of organic odorous or infectious matters. (See Calx Chlorinata, Liquor Sodæ Chlorinata, under *Calcium* and *Sodium*.)

Liq. Chlorig decomposes in sunlight, yielding Hydrochloric Acid and Oxygen.

Bromum (*Bromine*) is obtained from the Magnesium Bromide which remains in the mother liquor of sea water after all crystallizable salts have been crystallized out.

It is separated by passing Chlorine into the mother liquor, which then becomes tinged yellow by the separated Bromine, and shaking the liquor with Ether. The Ether absorbs the Bromine, and forms a separate layer, which is drawn off.

It is separated from the ethereal solution by shaking with a solution of Caustic Potash, the result being a watery solution of Potassium Bromide and Bromate, and a separate layer of pure Ether, since these salts are not soluble in Ether.

The watery solution is separated from the Ether, evaporated to dryness, and the residue ignited; which converts the Bromate into Bromide. On distilling with Sulphuric Acid and Black Oxide of Manganese, **Bromum** passes over.

Condensed in a receiver. Dark brown liquid, evolving red fumes.

Strong odour.

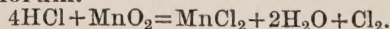
Volatile. Boils at 139° F. Freezes at—12° F.

Soluble in 30 parts of water. Miscible with Alcohol and Ether in all proportions.

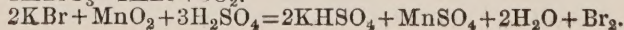
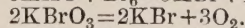
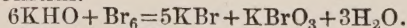
Chemical action similar to that of Chlorine, but less strongly developed.

* In practice, the charcoal is added before evaporation to dryness is quite complete, to ensure thorough admixture.

Chlorum.



Bromum.



Iodum (*Iodine*) is obtained from the Sodium Iodide which is contained in Kelp, the ashes of burnt seaweed, and which remains in the ley, with Sodium Bromide and a little Chloride, after separation of other salts. The ley, at this stage of manufacture, contains free Sulphuric Acid, added in a previous process. On distilling with successive small amounts of Black Oxide of Manganese, **Iodum** passes over.

Bromine passes over *after* the Iodine. The temperature is not allowed to rise high enough to liberate *Chlorine*.

Condensed in receivers; purified by sublimation.

Bluish-black scales, lustrous.

Soluble in 5,500 parts of water.

Soluble in 12 parts of Rect. Sp.

Soluble in 4 parts of Ether.

Soluble in 4 parts of Chloroform.

Freely soluble in solutions of the alkaline Iodides.

Fuses at 236° F.; volatilizes at 347° F.: volatilizes in the steam of hot watery solutions.

Chemical action similar to that of Chlorine and Bromine, but more feebly developed.

Unites readily with many metals.

Strikes a deep blue colour with starch.

OFFICIAL PREPARATIONS.

Liquor Chlorig. (See above.)

Liquor Iodii. 2½ gr. in a drachm of solution of Potassium Iodide.

Oleum Phosphoratum. About ⅒th gr. in 10 minims of Almond Oil.

Tinctura Iodii. 1½ gr. in a drachm of Rectified Spirit, with the same amount of Potassium Iodide.

Confectio Sulphuris. Sublimed Sulphur, Cream of Tartar, and Syrup of Orange, as 4, 1, 4 parts, with a little Tragacanth.

Pilula Phosphori. ⅓th gr. in 3 gr. of Tolu, Beeswax, and Curd Soap.

Linimentum Iodii. 7 gr. in a drachm of Rectified Spirit, with Camphor and a little Potassium Iodide.

Unguentum Sulphuris. 12 gr. in the drachm.

Unguentum Sulphuris Iodidi. 4 gr. in the drachm.

Unguentum Iodii. 2 gr. in the drachm.

Vapor Iodii. A drachm of Tinct. Iodii inhaled from an ounce of warm water.

Vapor Chlorig. (See *Calx Chlorinata*, under *Calcium*.)

Cataplasma Carbonis. A quarter of an ounce of *Carbo Ligni* in a poultice made of Bread 2 oz., Linseed meal 1½ oz. A similar amount of Charcoal sprinkled on the surface.

SECOND GROUP. (MINERAL ACIDS.) 9.

Acidum Sulphuricum.**Acidum Sulphurosum.****Acidum Nitricum.****Acidum Hydrochloricum.****Acidum Boricum.****Acidum Chromicum.****Acidum Phosphoricum****Concentratum.****Acidum Hydrobromicum****Dilutum.****Acidum Nitrohydrochloricum****Dilutum.**

Acidum Sulphuricum. The fumes of burning Sulphur or Iron Pyrites, FeS_2 , containing *Sulphurous Anhydride*, SO_2 , and atmospheric air, are passed into a leaden chamber, to which water and watery vapour are introduced. By placing a pot of Sodium Nitrate mixed with Sulphuric Acid in the furnace, vapours of Nitric Acid are passed in also.

The Sulphurous Anhydride, SO_2 , is oxidized at the expense of the Nitric Acid to *Sulphuric Anhydride*, SO_3 , which unites with water to form *Sulphuric Acid*, H_2SO_4 ; and Nitric Oxide, NO , is liberated.

The following changes then take place, and continue in rotation:—(1.) Nitric Oxide unites with atmospheric Oxygen to form Nitric Peroxide, NO_2 ; (2.) Nitric Peroxide, Sulphurous Anhydride, and a little watery vapour unite to form a compound of uncertain nature; which (3.) in presence of more water, is resolved into *Sulphuric Acid* and Nitric Oxide, NO .

On evaporating the dilute acid thus obtained as long as water alone passes off,—**Acidum Sulphuricum**, containing about 98 p. c. of H_2SO_4 , results.

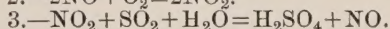
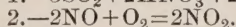
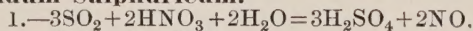
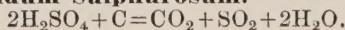
Oily, colourless liquid. Strongly caustic.

Sp. gr. 1.843.

Acidum Sulphurosum is obtained by distilling from a mixture of Wood Charcoal with Sulphuric Acid, and conducting the resulting gases, Carbonic Anhydride and Sulphurous Anhydride, SO_2 , into water. The former gas escapes, the latter is dissolved, forming Sulphurous Acid, H_2SO_3 . When the bubbles pass through the water undiminished in size, showing that the water is saturated, the process is complete.

Colourless liquid, evolving Sulphurous Anhydride.

Contains 6.4 p.c. of H_2SO_3 .

Acidum Sulphuricum.**Acidum Sulphurosum.**

Acidum Nitricum, Ac. Hydrochloricum, Ac. Boricum, and Ac. Chromicum are obtained by the action of Sulphuric Acid on Potassium or Sodium Nitrate, on Sodium Chloride, on Borax, and on Potassium Bichromate, respectively.

1. **Acidum Nitricum** is prepared by distilling from a mixture of the Nitrate with the acid, and heating the distillate to expel Nitrous Acid. Acid Potassium Sulphate remains in the retort.

Colourless liquid, emitting acrid fumes. Caustic.
Sp. gr. 1.42. Contains 70 p.c. of HNO_3 .

2. **Acidum Hydrochloricum** in similar manner; the acid obtained, which is a gas, being passed through a wash bottle into distilled water (in which it dissolves) till the latter has increased in volume by 32 p.c. Sodium Sulphate remains in the retort.

Colourless fuming liquid. Caustic.
Sp. gr. 1.16. Contains nearly 32 p.c. by weight of HCl .

3. **Acidum Boricum**, H_3BO_3 , is obtained by adding the acid to a boiling solution of purified Borax. It crystallizes out on cooling, Sodium Sulphate being left in the solution.

Washed from Sulphuric Acid. Pearly lamellæ, greasy to the feel.
Soluble in 3 parts of boiling water, 5 of Glycerine, 10 of Rectified Spirit, 25 of cold water.

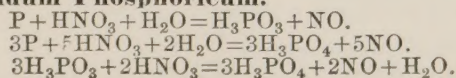
4. **Acidum Chromicum** (*Chromic Anhydride*), CrO_3 , by adding the acid to a concentrated solution of Potassium Bichromate. Acid Potassium Sulphate separates in crystals. The liquor is decanted, heated to 185°F , and more acid added. On cooling, the "Chromic Acid" crystallizes out.

Dried at 100°F . Crimson needles.
Deliquescent. Caustic.
Soluble in equal parts of water.

Acidum Phosphoricum Concentratum is prepared by heating Phosphorus with Nitric Acid in a flask connected with a vertical condenser, that returns the products of distillation into the flask. At first, Phosphoric Acid, H_3PO_4 , Phosphorus Acid, H_3PO_3 , and Nitric Oxide are formed. Afterwards the latter acid is oxidized to form Phosphoric. When the Phosphorus has all disappeared, the fluid is concentrated till nitric fumes cease to be given off, and nothing but Phosphoric Acid and water is left; then diluted to a stated strength.

Colourless syrupy liquid. Caustic.
Sp. gr. 1.5. Contains 66.3 p.c. of H_3PO_4 .

Acidum Phosphoricum.



Acidum Hydrobromicum Dilutum is made by passing Sulphuretted Hydrogen into an aqueous solution of Bromine. Hydrobromic Acid, HBr, and Sulphuric Acid result. The fluid is filtered and distilled. The first portion of the distillate, which contains Sulphuretted Hydrogen, is rejected, and the process stopped when Sulphuric Acid begins to come over. The distillate is diluted to a stated strength.

Colourless liquid.

Contains 10 p.c. of gaseous HBr.

The so-called **Acidum Nitrohydrochloricum Dilutum** is made by mixing 3 parts of *Ac. Nitricum*, 4 of *Ac. Hydrochloricum*, and 25 of water, and keeping for 14 days. It contains free Chlorine, and Nitrosyl Chloride, NOCl, besides Nitric, Nitrous, and Hydrochloric Acids.

Colourless liquid, evolving Chlorine.

PROPERTIES.

Specific Gravity of the Liquid Official Acida.

Ac. Sulphuricum	. 1.843.
Ac. Phosph. Conc.	. 1.500.
Ac. Nitricum	. 1.420.
Ac. Hydrochloricum	. 1.160.
Ac. Sulphurosum	. 1.025.

Relative Neutralizing Power.

40 gr. of Sodium Hydrate, NaHO, are neutralized by

50	gr. of Ac. Sulphuricum.
90	„ Ac. Nitricum.
114.8	„ Ac. Hydrochloricum.

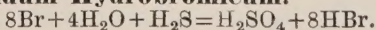
Ac. Sulphuricum, *Ac. Nitricum*, *Ac. Phosphoricum Concentratum*, and *Ac. Chromicum*, are **strongly caustic**.

Nitric Acid is a powerful oxidizing agent, 4HNO_3 being readily decomposed into $4\text{NO} + 2\text{H}_2\text{O} + 3\text{O}_2$ (Nitric Oxide, water, and nascent Oxygen).

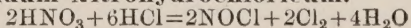
Sulphuric Acid has a powerful affinity for water, abstracting not only water from moist bodies and hydrated substances, but the elements of water from combination in organic compounds.

Hydrochloric Acid Gas and Phosphoric Acid possess a similar but less powerful property.

Acidum Hydrobromicum.



Acidum Nitrohydrochloricum.



Hence the *corrosive* action of the corresponding Pharmacopœial "**Acida**" upon organic substances, and the *desiccating* and *charring* actions of **Acidum Sulphuricum**, which is nearly pure Sulphuric Acid.

Chromic Acid abstracts water from organic substances, and in addition is a powerful oxidizing agent. Mixed with cold alcohol, it evolves aldehyde; warmed with Hydrochloric Acid it sets Chlorine free. Mixtures of it with alcohol, glycerine and some other organic substances are liable to explode. In dilute solutions it coagulates albumen and hardens organic tissues.

Sulphurous Anhydride or Sulphurous Acid, in presence of certain organic substances (vegetable colours, ferments, odorous and septic matters), forms fresh combinations. Hence it possesses *bleaching*, *deodorizing*, and *disinfecting* properties, and the power of *arresting fermentation and putrefaction*. From its (colourless) combinations with vegetable colours the latter may be set free by the action of an alkali.

Acidum Nitricum undergoes slow spontaneous decomposition in sunlight, and becomes coloured by Nitrous Acid.

Acidum Sulphurosum undergoes slow spontaneous oxidation, and becomes converted into a solution of Sulphuric Acid.

Acidum Sulphuricum and water, mixed together, undergo contraction in bulk, heat being disengaged in the process.

OFFICINAL PREPARATIONS.

Acidum Nitricum Dilutum. 20 p.c. of the **Acidum** in water.

Acidum Hydrochloricum Dilutum. 30 p.c. of the **Acidum** in water.

Acidum Sulphuricum Dilutum. $8\frac{1}{3}$ p.c. of the **Acidum** in water.

Acidum Sulphuricum Aromaticum. 7 p.c. of the **Acidum** in Rectified Spirit, flavoured by maceration on Cinnamon and Ginger.

Acidum Phosphoricum Dilutum. 15 p.c. of the **Acidum Concentratum** in water.

Acidum Nitrohydrochloricum Dilutum	} See above.
Acidum Hydrobromicum Dilutum	

Liquor Acidi Chromici. 1 in 4.

Unguentum Acidi Borici. 1 in 7.

THIRD GROUP:—ALCOHOLS AND THEIR DERIVATIVES. 15.

Spiritus Rectificatus.	Spiritus Ætheris Co.
Spiritus Tenuior.	Chloral Hydras.
Alcohol Ethylicum.	Butyl-Chloral Hydras.
Acetum.	Chloroformum.
Æther. Æther Purus.	Iodoformum.
Æther Aceticus.	Alcohol Amylicum.
Spiritus Ætheris Nitrosi.	Amyl Nitris.

Spiritus Rectificatus. Sp. Tenuior. Alcohol Ethylicum.

By the action of Malt-extract on Starch, $C_6H_{10}O_5$,—*Sugar*, $C_{12}H_{22}O_{11}$ is formed, the elements of water being taken into combination.

By the action of Yeast on Sugar,—*Glucose*, $C_6H_{12}O_6$; the elements of water being again combined.

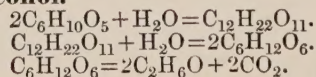
By a similar fermentation of Glucose,—*Alcohol*, C_2H_6O (*Ethyl Hydrate*, C_2H_5HO); Carbonic Anhydride, CO_2 , being liberated.

By these means weak alcoholic fluids (*Worts*) are obtained from Potatoes or Grain, which contain Starch; from infusions of Malt, which contains a crystallizable form of Sugar; from Molasses, or the residue of the Beet Sugar manufacture, which contain uncrystallizable forms; or from Grape-juice, which contains Glucose.

On distilling such *Worts*, the Alcohol passes over in the first portions of the distillate. By stopping the distillation at an early stage, *Spirits*, liquids containing a large proportion of Alcohol, are obtained.

Repetitions of the process (rectification) furnish *Spirits* containing progressively larger proportions of Alcohol.

Spirit rectified till only 16 p.c. of water remains (84 p.c. of Alcohol) forms **Spiritus Rectificatus**. It is free from flavouring or colouring matter.

Alcohol.

Diluted with three-fifths of its bulk of water, it forms **Spiritus Tenuior** (*Proof Spirit**), containing 49 p.c. by weight, 57 p.c. by volume, of Alcohol.

Simple distillation fails to separate Alcohol from a final 10 p.c. of water.

By digesting strong rectified spirit first on anhydrous Potassium Carbonate, then on fused Calcium Chloride, this residual water is separated, and **Alcohol Ethylicum**, *Absolute Alcohol*, C_2H_6O , can be distilled off.

Acetum. On leaving the Alcoholic *Wort* obtained by fermenting infusion of Malt or unmalted grain exposed to the air, the Alcohol is oxidized (through the agency of a microscopic organism, the *Mycoderma Aceti*) to *Acetic Acid*, $C_2H_4O_2$;—and **Acetum**, *Malt Vinegar*, containing about 5 p.c. of Acetic Acid, results.

Pale brown liquid, evolving Acetic Acid.

From Spiritus Rectificatus are prepared: 1. Æther. 2. Æther Aceticus. 3. Spiritus Ætheris Nitrosi. 4. Spiritus Ætheris Co.

In each case the preparation is commenced by mixing the Spirit with Sulphuric Acid, giving rise to the formation of an Acid Sulphate of Ethyl, $C_2H_5.H.SO_4$; and the mixture is placed in a retort or still.

To prepare—

1. Æther. A continuous stream of Spirit is directed into the mixture, and distillation commenced.

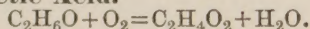
Acid Sulphate of Ethyl and Ethyl Hydrate (Alcohol) yield, besides bye-products, Ethyl Oxide (*Ethylic Ether*, $(C_2H_5)_2O$), and free Sulphuric Acid. The latter reacts with the incoming Alcohol to produce fresh Acid Sulphate of Ethyl, and the process continues until the Sulphuric Acid is wasted in forming the bye-products.

The products of the distillation are Ether, water, alcohol, Sulphurous Acid, Ethyl Sulphate, Acetic Acid, and some other substances.

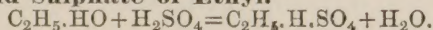
On agitating the distillate with slaked Lime and a solution of Calcium Chloride, the impurities are mostly dissolved and separated from the Ether, which floats on the surface. On separating the latter, and redistilling,—**Æther**, containing 92 p.c. of Ethylic Ether, the rest being chiefly alcohol,—is obtained.

* The old “proof” from which this apparently arbitrary standard was fixed, was to saturate gunpowder with the spirit and ignite it. If “above proof,” the alcohol fired the gunpowder; if “below proof” it burned off, and left the powder damp.

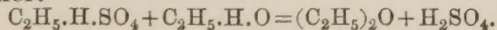
Acetic Acid.



Acid Sulphate of Ethyl.



Ether.



On agitating **Æther** with water to remove the alcohol, then digesting with recently burnt Lime and Calcium Chloride to remove all traces of water, and finally distilling again, **Æther Purus**, pure Ethylic Ether, $(C_2H_5)_2O$, comes over.

- 2. Æther Aceticus** (*Ethyl Acetate*), $C_2H_5.C_2H_3O$. Fused (anhydrous) Sodium Acetate is added. On distilling, it reacts with the Acid Sulphate of Ethyl to form Acid Sulphate of Sodium and Ethyl Acetate, which latter passes over with water and other impurities.

Purified from water, &c., by redistillation from Potassium Carbonate.
Pure Ethyl Acetate.

- 3. Spiritus Ætheris Nitrosi.** Nitric Acid and Copper are added. On distilling, a small amount of Ethyl Nitrite, $C_2H_5.NO_2$, is formed, which passes over, with water and unchanged Alcohol. The distillate, diluted with Rectified Spirit to a stated degree, forms *Spiritus Ætheris Nitrosi*, and contains 2 p.c. of Ethyl Nitrite.

- 4. Spiritus Ætheris Co.** *Hoffmann's Anodyne*. The mixture is allowed to stand for 24 hours, and then distilled till it begins to blacken. "*Ethereal Oil*," consisting of Ethyl Sulphate, Ethyl Sulphite, and Ethylene, $(C_2H_5)_2SO_4.(C_2H_5)_2SO_3.C_2H_4$, passes over, with some free Sulphurous Acid. The oil, washed from the acid by Lime water (in which it is not soluble), is poured into a mixture of Rectified Spirit with half its volume of Ether, 1 part of the oil to 64 of the solvent.

All the above are colourless liquids, with peculiar odours.

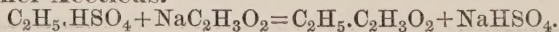
Chloral Hydras, $C_2HCl_3O.H_2O$, is prepared by passing dry Chlorine gas through absolute Alcohol. After a long series of substitution changes, *Chloral Alcoholate*, $C_2HCl_3O.C_2H_6O$, is formed. Other products of the action of Chlorine on the Alcohol are mixed with it. On shaking with Sulphuric Acid, *Chloral* (Trichloraldehyde) C_2HCl_3O , separates as an oily layer, and is distilled off. By redistillation with Quicklime, it is obtained in a still purer state. On adding a small quantity of water, the Hydrate is formed, with evolution of heat.

Crystallizes on cooling. Rhomboidal plates.

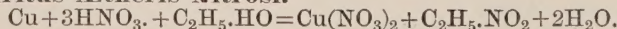
Soluble in $\frac{1}{3}$ part by weight of water; in less than 1 part of Rectified Spirit.

Decomposed in presence of alkalis, giving Chloroform and a Formate (see *Chloroform*).

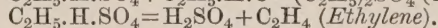
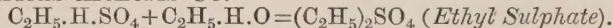
Æther Aceticus.



Spiritus Ætheris Nitrosi.



Spiritus Ætheris Co.



Part of the Sulphuric Acid is reduced to Sulphurous Acid in the process, and $2C_2H_5.H.O + H_2SO_3 = (C_2H_5)_2SO_3 + H_2O$ (Ethyl Sulphite).

Butyl-Chloral Hydras, $C_4H_5Cl_3O.H_2O$, by passing dry Chlorine gas into Ethylic Aldehyde, C_2H_4O , cooled to $14^\circ F.$, when Butyl-Chloral (*Trichlorobutylic Aldehyde*), $C_4H_5Cl_3O$, is formed as the final result of a long series of substitution changes. It is separated by fractional distillation, and converted into the hydrate by addition of water.

Minute shining scales.

Soluble in 50 parts of water, in equal parts of glycerine or Rectified Spirit.

Chloroformum is made by mixing Bleaching Powder and Slaked Lime with freely-diluted Alcohol, and distilling at a temperature between 100° and $180^\circ F.$ Among a variety of products, some of which combine with the Lime, *Chloral Hydrate* is formed; but, in presence of the Lime, is immediately decomposed to form Calcic Formate, $Ca(CHO_2)_2$, and **Chloroform** (*Trichloromethane*), $CHCl_3$. On distillation, **Chloroform**, water, and a little alcohol pass over.

Washed from alcohol by water, from water with Sulphuric Acid. Finally re-distilled from Calcium Chloride and Quicklime. One p.c. of absolute alcohol is added.

Colourless liquid, ethereal odour.

Iodoformum is made by mixing a solution of alkaline Iodide and Iodate (formed by adding Iodine to solution of Caustic Alkali) with Alcohol and free Alkali. On passing Chlorine into the mixture, *Iodine* is slowly liberated. By a reaction with the Alcohol and Alkali similar to that concerned in the production of Chloroform, **Iodoform** (*Iodomethane*), CH_3I , is produced, and deposited from the solution.

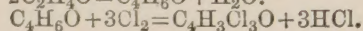
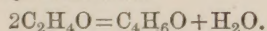
Filtered and washed. Yellow scales.

Soluble in 20 parts of ether or chloroform, in 120 of Rectified Spirit, freely in olive oil, not in water.

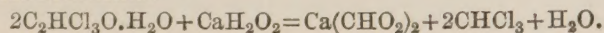
Alcohol Amylicum (*Fusel Oil*). The Worts produced by fermenting saccharine solutions with yeast (see above, p. 98) contain two forms of *Amylic Alcohol*, $C_5H_{12}O$, boiling between 253° and $260^\circ F.$ respectively. In distilling crude spirit (p. 98) they pass over. In rectifying the spirit they are left behind with the water, the Acetic, and other ethers. With the ethers, they separate spontaneously from the water, forming *Oil of Grain*. On fractional distillation, the ethers pass over first, the *Amylic Alcohols*, nearly pure, last; forming **Alcohol Amylicum**.

Colourless liquid, oppressive odour.

Butyl Chloral.



Chloroformum.



Amyl Nitris, $C_5H_{11}NO_2$, is obtained from purified Fusel Oil—

a. By passing Nitrous Anhydride into it.

Purified from adhering acid, by mixing with Caustic Alkali and redistilling.

Or, *β.* By heating with Nitric Acid;

Or, *γ.* By a process similar to that employed in making Nitrous Ether (see above), and separated from other products by distilling at a temperature below 212° F.

Further purified from acid by mixing with Caustic Alkali; from the remains of the other impurities by distilling at 205° F.

Yellowish fluid, peculiar odour.

****** The preparation of Valerianic Acid from Amylic Alcohol is described under **Sodii Valerianas**, in the Sixth Group.

PROPERTIES.

Specific Gravity.

Æther Purus	.	.	.	.	·720
Æther	.	.	.	.	·735
Alcohol Ethylicum	.	.	.	·797 to	·800
Alcohol Amylicum	.	.	.	.	·818
Spiritus Rectificatus	.	.	.	.	·838
Spiritus Ætheris Nitrosi	.	.	.	·840 to	·845
Amyl Nitris	.	.	.	.	·880
Æther Aceticus	.	.	.	.	·900
Spiritus Tenuior	.	.	.	.	·920
Acetum	.	.	.	.	1·018
Chloroformum	.	.	.	.	1·497

Boiling points.

Æther Purus	.	.	.	.	96° F.
Æther	.	.	.	.	105° F.
Chloroformum	.	.	.	.	142° F.
Æther Aceticus	.	.	.	.	166° F.
Alcohol Ethylicum	.	.	.	.	172° F.
Spiritus Rectificatus	.	.	.	.	180° F.
Amyl Nitris	.	.	.	.	205° F.
Alcohol Amylicum	.	.	.	.	270° F.

Ether and Chloroform, and in a less degree Alcohol and Spirits, evaporate rapidly at ordinary temperatures, abstracting heat powerfully from contiguous bodies.

Rectified Spirit **mixes** with Water, Ether, Acetic Ether, Amylic Alcohol, and Amyl Nitrite, in all proportions.

Ether mixes with Acetic Ether and Amylic Alcohol in all proportions.

Æther purus is **soluble** in 10 parts by measure of water. It also takes up $\frac{1}{10}$ th part of water.

Acetic Ether is **soluble** in 12 parts of water.

Chloroform in 200 parts of water, $1\frac{1}{2}$ parts of Ether, $\frac{7}{10}$ ths part of

Rectified Spirit (not in Glycerine).

Amyl Nitrite is **insoluble**, Fusel Oil hardly soluble, in water.

Eighteen parts of Rectified Spirit mixed with 18 parts of water are contracted to 34 parts.

Rectified Spirit **dissolves** balsams, Camphor and volatile oils, Castor Oil, Sugar, Tannic and Gallic Acids, vegetable alkaloids and colouring matters, Iodine and Bromine, Caustic Potash and Soda, Lithia, Ammonia, and many alkaline and metallic salts, chiefly those that are deliquescent.

It partially dissolves wax with heat.

Ether and Chloroform **dissolve** resins, balsams, Gutta Percha, Camphor, fixed and volatile oils, fats, most vegetable alkaloids, Iodine and Bromine.

They separate the last three from watery solutions.

They dissolve wax partially.

Ether dissolves Corrosive Sublimate and Gun-cotton.

Ether exposed to air and light is partially decomposed, Acetic Acid being formed.

The vapour of Ether makes an explosive mixture with atmospheric air.

A mixture of equal parts of Chloral Hydrate and Camphor liquefies spontaneously, and may be used as a liniment.

OFFICINAL PREPARATIONS.

Aq. Chloroformi. Water saturated with Chloroform.

Spiritus Chloroformi. Chloroform, diluted with 19 parts of Rectified Spirit.

Spiritus Ætheris. Ether, diluted with 2 parts of Rectified Spirit.

Spiritus Ætheris Co. (see p. 100).

Spiritus Ætheris Nitrosi (see p. 100). Contains 2 p.c. of Ethyl Nitrite.

Tinct. Chloroformi Co. Chloroform, diluted with 4 parts of Rectified Spirit and 5 parts of *Tr. Cardamomi Co.* (twice as strong as the *Spiritus*).

Tinct. Chloroformi et Morphinae. *A substitute for Chlorodyne.* Contains in each 10 minims, $\frac{1}{48}$ gr. of Morphine, $\frac{5}{8}$ min. of Ac. Hydrocyan D., and $1\frac{1}{4}$ min. of Chloroform; with Ether, Rectified Spirit, Oil of Peppermint, Liquorice, Treacle, and Syrup.

Syrupus Chloral. 10 gr. in a drachm.

Vin. Aurantii. An alcoholic fluid made by fermenting saccharine solutions flavoured with bitter orange peel ("Orange Wine" of the grocers). Contains about 12 p.c. of Alcohol.

Vin. Xericum. Sherry Wine. Contains 17 or 18 p.c. of Alcohol.

Spiritus Vini Gallici. French Brandy. Contains from 48 to 56 p.c. of Alcohol.
These three are used as vehicles.

Mistura Spiritus Vini Gallici. 4 oz. of French Brandy and the same amount of *Aq. Cinnamomi*, mixed with the yolks of two eggs, and sweetened with half an ounce of sugar.

Suppositoria Iodoformi. 3 gr. in each.

Unguentum Iodoformi. 1 in 10.

Linimentum Chloroformi. Chloroform, mixed with equal parts of *Lin. Camphoræ*. (Oil is soluble in Chloroform.)

Amyl Nitrite, which is used as an inhalation, is usually dispensed in thin glass capsules, holding three minims, which are readily broken in a handkerchief at the time of use.

FOURTH GROUP :—TAR-PRODUCTS AND ORGANIC ACIDS. 14.

Pix Liquida.	Ac. Tartaricum.
Creasotum.	Ac. Citricum.
Acidum Aceticum.	Ac. Tannicum.
Ac. Aceticum Glaciale.	Ac. Gallicum.
Ac. Carbolium.	Ac. Lacticum.
Ac. Carbol. Liquefactum.	Ac. Hydrocyan. Dil.
Ac. Salicylicum.	Ac. Oleicum.

Pix Liquida (*Wood Tar*), **Creasotum**, and **Acetic Acid**, are products of the destructive distillation of the wood of *Pinus Sylvestris* and other species of *Pinus*.

On such distillation, there pass over—

- 1.—Gaseous bodies, chiefly Carbonic Anhydride, Carbonic Oxide, and Hydrogen.
- 2.—Water, and liquids soluble in water, chiefly **Acetic Acid**, Methyl, Ethyl, and Allyl alcohols, Methylic Acetate, and Acetone.
- 3.—**Oily liquids** insoluble in water, holding in solution solid substances also insoluble in water.

The liquids and solids of Class 3, which include a number of hydrocarbons, paraffins, benzene, etc.; a number of alcohols, chiefly phenols; resinous substances; and various other bodies such as naphthalene and pyrene;—form *Wood-tar* or **Pix Liquida**.

Thick, viscid, brownish-black, with an aromatic odour.

Creasotum. The heavier portions of the *Oil* obtained from *Wood-tar* contain a variety of alcohols, chiefly *phenols*, C_6H_6O , with a number of hydrocarbons, some acids, and other compounds. By washing these heavier portions with a solution of Sodium Carbonate, they are freed from acid. On distilling, two oils are obtained, a heavier and a lighter, which separate on mixing with water. The lighter oil, which floats on the water, contains the *alcohols* and some of the hydrocarbons.

On adding a solution of caustic potash to the *lighter oil* the *alcohols* unite with the potash to form soluble compounds. The solution is decanted. On boiling in the open air, some impurities separate. On adding dilute Sulphuric Acid, the *alcohols* are deposited, but not quite in a pure state. By repeating the treatment with alkali and acid alternately, the impurities (hydrocarbons) are gradually eliminated. By digesting with Calcium Chloride, the adherent water is abstracted; and on distilling, the *alcohols* pass over;—forming **Creasotum**.

Oily liquid, colourless, strongly refracting, pungent odour, burning taste.

Sp. gr., 1.071. Boiling point about 400 °F.

Soluble in 400 parts of water, in equal parts of Glacial Acetic Acid. Insoluble in glycerine.

Separates on diluting its solution in Acetic Acid with water.

Coagulates albumen; preserves animal substances from decay. Ignites spontaneously with Argentic Oxide.

Acidum Aceticum, Ac. Acet. Glaciale. On distilling the *liquid products* of the destructive distillation of wood, Methylic Alcohol and Acetone pass over first. They are separated. On further distillation *Pyroligneous Acid*, *i.e.*, a dilute and impure Acetic Acid, passes over. By mixing "Pyroligneous Acid" with milk of Lime, a solution of impure Calcium Acetate ("pyrolignite") is obtained, from which Acetic Acid for manufacturing purposes is prepared.

On mixing the solution of "pyrolignite" with one of Sodium Sulphate, Calcium Sulphate is precipitated, and impure *Sodium Acetate* remains in the solution, which is decanted and evaporated to dryness. On fusing the *Acetate*, tarry matters are burned off; by redissolving and repeatedly crystallizing it, it is completely purified.

On mixing the purified and crystallized Sodium Acetate, $\text{NaC}_2\text{H}_3\text{O}_2 \cdot 3\text{H}_2\text{O}$, with Sulphuric Acid, and distilling,—**Acidum Aceticum**, containing 33 p.c. of Acetic Acid, $\text{C}_2\text{H}_4\text{O}_2$, passes over.

Colourless liquid, pungent odour.

By using fused (*i.e.*, anhydrous) Sodium Acetate, and concentrated *Acidum Sulphuricum*,—**Acidum Aceticum Glaciale**, containing at least 99 p.c. of $\text{C}_2\text{H}_4\text{O}_2$, is obtained.

Colourless liquid, with a more powerful odour than the **Acidum**; or flat pearly plates.

The strongest Acetic Acid obtainable.

Specific Gravity of

Acidum Aceticum . . . 1.044.

Acidum Aceticum Glaciale 1.058, increased by adding 10 p.c. of water.

Acidum Aceticum Glaciale crystallizes at 34°F. , and remains crystalline till 48°F.

Acetic Acid volatilizes at ordinary temperatures.

Acetic Acid mixes with water, Rectified Spirit, and ether in all proportions.

The Glacial Acid dissolves resins, gum-resins, Camphor, volatile oils and Creasote. They are precipitated on dilution with water.

The Glacial Acid is highly corrosive to organic substances.

Acidum Carbolicum (*Phenol*), $\text{C}_6\text{H}_6\text{O}$, is obtained from the light oils which are among the products of the distillation of Coal Tar, by fractional distillation after various processes of purification.

On distilling COAL-TAR, Ammonia and some permanent gases pass over first, then water and Ammoniacal salts. With the water come *oily matters*, at first lighter than water, but gradually increasing in specific gravity. The *lighter oils* that float on the water contain *Phenol*, $\text{C}_6\text{H}_6\text{O}$, with Cresol and other homologues; also Naphthalene and other hydrocarbons, and many bodies of undetermined constitution.

On agitating these *lighter oils* with Sulphuric Acid, some of the impurities are deposited as a tarry mass. On treating the remaining oil with solution of Soda, or milk of Lime, *Phenol* and its homologues enter into combination with the base; and a solution of *Phenates*, *etc.*, is obtained, which holds Naphthalene and other substances dissolved. On dilution, much of the Naphthalene is precipitated; on exposure to air, other impurities also. By the cautious addition of Sulphuric Acid, the homologues, which are weaker acids than *Phenol*, are precipitated, leaving a comparatively pure solution of *Phenate* and Sulphate. On

saturating the filtered solution with Sulphuric Acid, *Phenol*, comparatively pure, is precipitated. By repeating the processes of solution in alkali and neutralization with acid, the *Phenol* is further purified. Finally, on fractional distillation, pure **Acidum Carboliceum** passes over at and about 360° F., as a colourless liquid with a pungent odour.

Crystallizes on cooling. Long needles, which become pink on keeping.

Soluble in 15 parts of water (12 to 18).

$1\frac{3}{4}$ part of olive oil.
 $\frac{1}{3}$ part of chloroform.
 $\frac{2}{7}$ part of glycerine.
 $\frac{1}{4}$ part of ether.
 $\frac{1}{5}$ part of alcohol.

Also in volatile oils.

Fuses at 92° F. At 60° it will unite with from 5 to 40 p.c. of water to form an oily fluid, which remains liquid at ordinary temperatures.

Deliquescent in air above 60°.

Volatilises slowly at ordinary temperatures.

Does not redden litmus.

Coagulates albumen, and abstracts water from organic substances.

Destroys septic and odorous particles, even in a diluted form.

Acidum Carboliceum Liquefactum (*Carbolic Oil*) is Carbolic Acid liquefied by the addition of 10 p.c. of water.

Oily liquid. Sp. gr., 1·065.

Destroys animal tissues, coagulating albumen and abstracting water.

At 92° F. mixes with water in all proportions.

At 60° F. *dissolves* 18-26 p.c. of water.

At 60° F. *dissolves in* water to the extent of the Carbolic Acid it contains, any excess remaining separate as oily drops which sink in the water.

Acidum Salicylicum is obtained by mixing Carbolic Acid with Caustic Soda, so as to produce Sodium Phenate, $\text{NaC}_6\text{H}_5\text{O}$, drying the Phenate, heating it to 220-250°, and passing Carbonic Anhydride through it. Sodium Salicylate, $\text{NaC}_7\text{H}_5\text{O}_3$, is formed. On dissolving and adding an acid, Salicylic Acid, $\text{HC}_7\text{H}_5\text{O}_3$, is precipitated.

Washed, and dissolved in boiling water. Crystallizes out on cooling. Shining white needles.

Always contaminated with some other substances when produced by this method.

Or:—by boiling Oil of Winter Green* or Oil of Sweet Birch,† which are mainly composed of Methyl Salicylate, $\text{CH}_3\text{C}_7\text{H}_5\text{O}_3$, with a solution of Caustic Potash, distilling to separate the resulting Potassium Salicylate from other substances, and precipitating Salicylic Acid, as before, from a solution of the distilled salt.

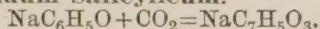
Redissolved and purified by crystallization, as above.

Obtained nearly pure by this method, which is, however, a costly one.

* The essential oil yielded by the plant *Gaultheria Procumbens* (*Partridge-berry*), ord. *Ericaceae*.

† The essential oil yielded by the plant *Betula Lenta*, ord. *Betulaceae*

Acidum Salicylicum.



Soluble in 800 parts of cold water.
 10 parts of boiling water.
 5 parts of Rectified Spirit.
 Also in 8 parts of lard at 180° F.

Soluble in 24 parts of cold water with 1 part of Potassii Acetas, or 2 of Potassii Citras.
 Destroys septic particles. Preserves organic matters from putrefaction.

Acidum Tartaricum, $\text{H}_2\text{C}_4\text{H}_4\text{O}_6$, is obtained from Cream of Tartar (*Acid Tartrate of Potassium*), $\text{KHC}_4\text{H}_4\text{O}_6$. (1.) To a solution of Cream of Tartar in boiling water Chalk is added. Carbonic Anhydride is given off, *Calcium Tartrate* is precipitated, and neutral *Potassium Tartrate* remains in solution. (2.) On adding, further, a solution of Calcium Chloride, the whole of the Tartaric Acid is precipitated as *Calcium Tartrate*; Potassium Chloride remaining in solution. (3.) On digesting the *Calcium Tartrate* (collected and washed) with diluted Sulphuric Acid, a solution of Tartaric Acid, with a little Calcium Sulphate, is obtained; the greater part of the Calcium Sulphate remaining undissolved. (4.) On evaporating the filtered solution to a sp. gr. of 1.21, the sulphate crystallizes out. On further evaporating the mother liquor, **Acidum Tartaricum** crystallizes out.

Purified by recrystallization. Oblique rhombic prisms.

Acidum Citricum (*Citric Acid*), $\text{H}_3\text{C}_6\text{H}_5\text{O}_7$, is contained in Lemon-juice, and is separated by neutralizing with Chalk or Lime, so as to form Calcium Citrate, and proceeding just as in the case of Tartaric Acid. The crystalline product, $\text{H}_3\text{C}_6\text{H}_5\text{O}_7 \cdot \text{H}_2\text{O}$, is **Acidum Citricum**.

Rhombic prisms.

Acidum Tartaricum dissolves in—

Less than 1 part of water; 3 parts of Rectified Spirit.

Acidum Citricum in—

$\frac{3}{4}$ part of water; $1\frac{1}{2}$ part of Rectified Spirit; 2 parts of glycerine.

From powdered Galls (p. 57), which contain a glucoside, Gallo-tannin, are obtained—

1. By exposure to air and moisture for three days, **Acidum Tannicum**, $\text{C}_{27}\text{H}_{22}\text{O}_{17}$.

Extracted by ether and water. The former allowed to evaporate spontaneously, the latter at 212° F.

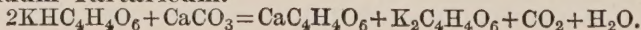
Scales or amorphous masses; light brown.

2. **Acidum Gallicum**, $\text{H}_3\text{C}_7\text{H}_3\text{O}_5 \cdot \text{H}_2\text{O}$, by boiling in water with dilute Sulphuric Acid, straining through calico while hot, and cooling.

Crystallizes out. Purified by Animal Charcoal and repeated crystallization.

Needles; fawn-coloured.

Acidum Tartaricum.



Tannic Acid is soluble in—

Equal parts of water or Rectified Spirit; 3 parts of glycerine.

Gallic Acid in—

100 parts of cold water; 3 parts of boiling water; 8 parts of Rectified Spirit;* 20 parts of glycerine.

Both Gallic and Tannic Acids give a black precipitate with Ferric Salts.

Tannic Acid (not Gallic) precipitates albumen, gelatine, and vegetable alkaloids.

Tannic Acid, on boiling with Sulphuric Acid, yields glucose and Gallic Acid.

Acidum Lacticum. *Lactic Acid*, $\text{HC}_3\text{H}_5\text{O}_3$, is obtained from Sugar by means of a ferment contained in decaying Cheese. Eight parts of Sugar and one of Cheese are allowed to stand in water at a temperature of 80°F. , for two or three weeks. Chalk being added from time to time, crystals of Calcium Lactate are formed. They are separated, washed, and purified by recrystallization from boiling water. On carefully adding Sulphuric or Oxalic Acid, Lactic Acid with about 25 p.c. of water separates, forming **Acidum Lacticum**.

A syrupy liquid, pale brown.

Miscible in all proportions with water, Rectified Spirit, or Ether.

Acidum Hydrocyanicum Dilutum. *Hydrocyanic Acid*, HCN , is prepared from refuse animal matter through the intermediate stage of a salt termed Potassium Ferrocyanide.

1. On heating fragments of hides, hoofs, hair, &c., with iron filings and Potassium Carbonate to dull redness, the Carbonate loses its oxygen, and the Potassium combines with carbon and nitrogen to form *Potassium Cyanide*, KCN , (KCy). On lixiviating the mass in the open air, the Cyanide dissolves, and combines with the iron and with oxygen, forming *Potassium Ferrocyanide*, K_4FeCy_6 , and Potassium Hydrate, KHO , both of which remain in solution. On evaporating, the *Ferrocyanide* crystallizes out.

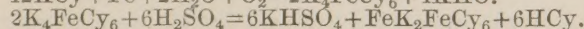
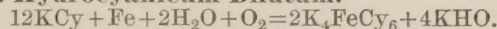
(Truncated pyramids, lemon-yellow.)

2. On distilling from a mixture of Sulphuric Acid with solution of Potassium Ferrocyanide, *Hydrocyanic Acid*, HCN , passes over; Acid Potassium Sulphate and Ferrous Dipotassium Ferrocyanide, $\text{FeK}_2\text{FeCy}_6$, remaining. Passed into water, the acid is dissolved. Diluted to a stated degree, it forms **Acidum Hydrocyanicum Dilutum**, containing 2 p.c. of HCN .

Colourless liquid, evolving Hydrocyanic Acid.

* From this solution the acid is not precipitated by dilution.

Ac. Hydrocyanicum Dilutum.



Acidum Oleicum, see p. 112.

Straw coloured liquid.

Sp. gr. '86 to '89.

Insoluble in water; readily soluble in alcohol, chloroform, or ether.

Solidifies at 40° F.

RELATIVE NEUTRALIZING POWER OF THE ORGANIC "ACIDA."

40 grains of Caustic Soda are neutralized by—

3 drachms of Acidum Aceticum.

1 drachm of Acid. Acet. Glaciale.

70 grains of Acidum Citricum.

75 grains of Acidum Tartaricum.

120 grains of Acidum Lacticum.

OFFICIAL PREPARATIONS.

Acidum Aceticum Dilutum. 12½ p.c. of *Acidum* in water; about 4 p.c. of real Acetic Acid.

Acidum Lacticum Dilutum. Contains 15 p.c. of the *Acidum*.

Glycerinum Acidi Carbolici. Nearly 1 gr. in 5 min.; 11½ gr. in 1 drachm.

Glycerinum Acidi Tannici. 1 gr. in 5 min.; 12 gr. in 1 drachm.

Glycerinum Acidi Gallici. 1 gr. in 5 min.; 12 gr. in 1 drachm.

Mistura Creasoti. Creasote dissolved in water faintly acidulated with Acetic Acid, sweetened, and flavoured with Juniper. One minim of Creasote in the fluid ounce.

Suppositoria Acidi Tannici. 3 gr. in each, with Cocoa-butter, lard, and wax.

Suppositoria Tannici cum Sapone. 3 gr. in each, with curd soap and starch.

Suppositoria Acidi Carbolici cum Sapone. 1 gr. in each, with curd soap and starch.

Trochisci Acidi Tannici. ½ gr. in each, flavoured with Tolu.

Vapor Acidi Hydrocyanici. 10 to 15 min. of Ac. Hydrocy. Dil., inhaled from a drachm of water.

Vapor Creasoti. 12 minims of creasote in 8 ounces of boiling water. Air to be passed *through* the solution.

Unguentum Acidi Carbolici. 1 part in 19.

Unguentum Acidi Salicylici. 1 part in 28.

Unguentum Creasoti. Creasote in Simple Ointment,—1 part in 9.

Unguentum Picis Liquidæ. 5 parts of Tar stirred into 2 of melted Bees-wax.

Oleic Acid is used in making the "Oleates" of Zinc and Mercury.

FIFTH GROUP. 7.

Pyroxylin (Collodium).**Glycerinum.****Nitroglycerinum.****Paraffinum Durum.****Paraffinum Molle.****Mica Panis.****Theriaca.**

Pyroxylin (*Gun-cotton*) is made by soaking Cotton-wool (*Gossypium*, p. 42), which consists almost entirely of pure Cellulose ($C_6H_{10}O_5$), in a mixture of equal parts of *Ac. Sulphuricum* and *Ac. Nitricum* for three minutes. It consists of two Nitrates, $C_{18}H_{22}O_7(NO_3)_8$ and $C_{18}H_{23}O_8(NO_3)_7$.*

Washed from acid, dried at $212^\circ F$.

Indistinguishable in appearance from the original Cotton-wool.

Explosive.

Soluble partly in ether (the second nitrate), and partly in a mixture of ether and alcohol (the first nitrate).

Collodium (*Collodion*) is a solution of Pyroxylin in 36 parts of Ether with 12 of Rectified Spirit.

Colourless.

Dries rapidly, leaving a film impermeable to air, which contracts in drying.

Highly inflammable.

Glycerinum (Acidum Oleicum). Fixed Oils and Fats are composed of Glyceric salts of acids of the Acetic or Oleic series, and yield *Glycerine*, $C_3H_5(HO)_3$, and Oleates, Margarates, Stearates, &c., on decomposition with alkalis.

On placing fat and water in a gently heated still, and passing steam heated to $500^\circ F$. into the mixture, the Glyceric salts are decomposed; and water, *Glycerine*, and fatty acids pass over. The aqueous solution of *Glycerine* is separated from the insoluble acids. On evaporating till water ceases to be driven off, **Glycerinum**, containing 95 p.c. of *Glycerine*, is left.

A syrupy, colourless fluid; sweet taste.

Sp. gr., 1.250.

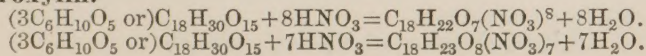
Miscible with water, Rectified Spirit, or chloroform in all proportions.

Not miscible with ether or oils.

Absorbs water from the air.

Distils with superheated steam at $500^\circ F$.; cannot be distilled alone at ordinary pressures without decomposition.

* In preparing gun-cotton for explosive purposes, more concentrated acids are used, and a tri nitrate $C_6H_5O_2(NO_2)_3$ is produced, which is more explosive than **Pyroxylin**, but is soluble only in Acetic Ether.

Pyroxylin.

Dissolves, amongst other substances, Tannic and Gallic Acids, Carbolie Acid, Borax, Iodine, Bromine, Iodide of Sulphur, Perchloride of Iron, Salicylic Acid, Nitrate of Bismuth, Salts of Morphine, Quinine, Strychnine, Veratrine, and Atropine.

Pure, or diluted with 10 parts of water, it preserves animal matters from putrefaction.

Acidum Oleicum, which is fluid, may be separated by pressure from the other fatty acids, which are solid at ordinary temperatures. (See p. 100.)

Nitroglycerinum (*Glyceric tri-nitrate*), $C_3H_5(NO_3)_3$, which is officinal only in the form of Tablets, is made by adding Glycerine to concentrated Nitric Acid, cooled by a mixture of ice and salt, and afterwards mixing with concentrated Sulphuric Acid. It separates spontaneously.

A yellow oil.

Slightly soluble in water, more so in Rectified Spirit.

Highly explosive.

Paraffinum Durum (*Paraffin*), a mixture of several of the harder members of the Paraffin series of Hydrocarbons, is obtained by distillation from oil-shale and separation of the liquid oils by refrigeration.

Purified. Colourless greasy crystals.

Melts at 110° — 145° F.

Freely soluble in ether; slightly in alcohol; not in water.

Paraffinum Molle (*Vaseline*), a mixture of several of the more fluid members of the same series, is obtained by purifying the less volatile portions of Petroleum.

Yellowish; translucent; greasy.

Melts at 95° — 105° F.

Solubility as Paraffin.

Mica Panis is the *crumb* of ordinary wheaten bread.

Theriaca (*Treacle*), is an uncrystallizable modification of Cane-sugar, formed during the process of refining. (See p. 61.)

Very tenacious.

OFFICINAL PREPARATIONS.

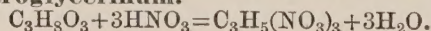
Tabellæ Nitroglycerini. Each $2\frac{1}{2}$ grains of chocolate, with $\frac{1}{100}$ th gr. of Nitroglycerin.

Collodium Flexile. Collodion with 20 grains of Canada Balsam and 10 min. of Castor Oil added to each fluid ounce. Does not contract in drying.

Collodium Vesicans. Liquor Epispasticus (p. 17) with 5 p.c. of Gun-cotton dissolved in it.

Glycerine is used as a vehicle in various preparations; Mica Panis in making Charcoal Poultice (pp. 12, 93); Treacle in making pills; the Paraffins as vehicles in ointments.

Nitroglycerinum.



SIXTH GROUP:—METALS AND METALLIC COMPOUNDS. 144.

Described in the following order.

POTASSIUM COMPOUNDS.

SODIUM ,,

AMMONIUM ,,

IRON ,,

MERCURIAL ,,

CALCIUM ,,

ZINC ,,

LEAD ,,

BISMUTH ,,

ANTIMONIAL COMPOUNDS.

ARSENICAL ,,

MAGNESIUM ,,

ALUM.

LITHIUM COMPOUNDS.

SILVER ,,

COPPER ,,

CERIUM.

MANGANESE.

* * *The Properties and Officinal Preparations are described at the end of each division.*

POTASSIUM COMPOUNDS. 18 *Officinal.*

NITRE.	{ Potassii Nitras. <i>Acid Potassium Sulphate.</i> ... }	}	P. Sulphas.
WOOD ASHES.— Potassii Carbonas.	{	}	Potassa. { P. Iodidum. P. Bromidum. P. Permanganas. Sapo Mollis.
			P. Bicarbonas.
			P. Acetas.
			P. Citras.
			P. Chloras.
			Potassa Sulphurata.
			P. Bichromas.
			P. Ferrocyanidum.—P. Cyanidum.
			P. Tartras.
ARGOL.— Potassii Tartras Acida. ... }			

NITRE, or SALTPETRE, is an impure *Potassium Nitrate*, formed spontaneously in soils containing the base Potassa, by decomposition of organic matters and oxidation of the resulting Ammonia to form Nitric Acid; found as an efflorescence in the E. Indies, cultivated artificially in Europe. Separated by lixiviation and crystallization.

From Nitre are obtained—

- 1. Potassii Nitras**, pure Potassium Nitrate, KNO_3 , by solution and recrystallization.

Six-sided prisms, striated.

- 2. Potassii Sulphas**, K_2SO_4 , by heating the Nitre with diluted Sulphuric Acid, as in making Nitric Acid (p. 95), and neutralizing the resulting *Acid Sulphate* with Potassium Carbonate.

Crystallizes out on evaporation.

Six-sided prisms, with pyramidal ends.

WOOD ASHES, obtained by burning wood in heaps or pits, sheltered from the wind, contain *Potassium Carbonate*, the result of ignition of organic salts of Potassium, mixed with other salts, soluble and insoluble, and with organic matter.

From Wood Ashes are obtained by lixiviation and evaporation, *Potashes*, i.e., Potassium Carbonate contaminated with other soluble salts and with organic matter.

On igniting Potashes in a reverberatory furnace, so as to burn off the organic impurities,—*Pearlash*, i.e., Potassium Carbonate contaminated only with other salts, soluble, but less so than itself.

On lixiviating Pearlash with *its own weight only* of distilled water, and decanting,—a nearly pure solution of **Potassii Carbonas**, K_2CO_3 .

Evaporated to dryness. Crystalline powder.

From Potassii Carbonas are prepared—

1. **Liquor Potassæ**, by boiling in water with slaked Lime, decanting, and diluting to a stated degree; and **Potassa Caustica**, KHO , by evaporating Liquor Potassæ till only the fused Potassa is left.

Cooled in moulds. Solid sticks.

2. **Potassii Bicarbonas**, $KHCO_3$, by saturating a strong solution with Carbonic Acid.

Crystallizes out on evaporation. Rhombic prisms.

3. **Potassii Acetas**, $KC_2H_3O_2$, by neutralizing with Acetic Acid.

Evaporated to dryness, fused and solidified in mass. Foliaceous satiny masses.

4. **Potassii Citras**, $K_3C_6H_5O_7$, by neutralizing with Citric Acid.

Evaporated to dryness, and granulated by stirring during the process; then powdered.

5. **Potassii Chloras**, $KClO_3$, by mixing with slaked Lime, moistening with water, and passing Chlorine gas.

Calcium Chloride and Carbonate are formed as well as Potassium Chlorate. The Chloride and Chlorate are dissolved out by boiling water; the latter crystallizes out on cooling.

Purified by recrystallization. Rhomboidal plates.

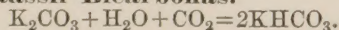
6. **Potassa Sulphurata** (*Liver of Sulphur*), a mixture of Potassium Sulphide and Sulphate, with some Sulphite, Sulphosulphate, and other Sulphur compounds, by heating with half its weight of Sulphur till effervescence (evolution of water and carbonic anhydride) ceases, and then fusing.

Solidified in mass. Amorphous; grey.

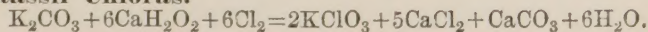
7. **Potassii Bichromas**, $K_2Cr_2O_7$, by heating in a reverberatory furnace with Chrome Ironstone,* $FeO.Cr_2O_3$, which yields *Potassium*

* A little chalk is added to keep the mass porous by evolution of carbonic anhydride, and to prevent complete fusion.

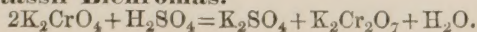
Potassii Bicarbonas.



Potassii Chloras.



Potassii Bichromas.



Chromate, K_2CrO_4 , dissolving out the Chromate, and supersaturating the solution with Nitric Acid.

Crystallizes out on evaporation.

Purified by recrystallization. Four-sided tables, orange red.

8. **Potassii Ferrocyanidum**, K_4FeCy_6 , by heating to dull redness with iron filings and animal refuse, and lixiviating the mass in the open air.

The Carbonate loses its oxygen and the Potassium combines with carbon and nitrogen to form Potassium Cyanide, $KCN(KCy)$. On lixiviation in the air the Cyanide dissolves and combines with the iron and with oxygen to form the Ferrocyanide and Caustic Potash.

Crystallizes out on evaporation. Truncated pyramids; lemon yellow.

From Liquor Potassæ are prepared—

1. **Potassii Iodidum**, KI , by the addition of Iodine, which forms the Iodide and the Iodate, KIO_3 . On evaporating to dryness and fusing with Charcoal, Carbonic Oxide is given off, and Iodide only remains.

Dissolved out, filtered, and crystallized. Opaque cubes.

2. **Potassii Bromidum**, KBr , by a similar process, using Bromine for Iodine.

Cubes.

From Potassa Caustica are prepared—

1. **Potassii Permanganas**, $K_2Mn_2O_8$, by semifusing with Black Oxide of Manganese, MnO_2 , and Potassium Chlorate (as an oxidizing agent), which yields Potassium Manganate, K_2MnO_4 , and Chloride; dissolving out the Manganate by means of boiling water, and saturating the solution with Carbonic Acid.

Potassium Permanganate and Carbonate, and Manganese Peroxide, MnO_2 , result. The former crystallizes out on evaporation.

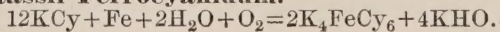
Purified by dissolving, filtering through asbestos, and recrystallizing. Dark red needles.

2. **Sapo Mollis** (*Soft Soap*), impure Potassium Oleate, by boiling a solution with Olive Oil.

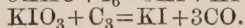
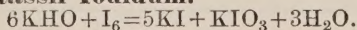
(Olive Oil is chiefly Olein, *i.e.*, Glyceric Oleate.)

Washed from glycerine and water by a strong solution of Caustic Potash. Soft gelatinous mass. Yellow.

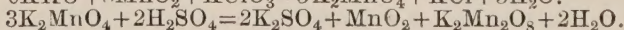
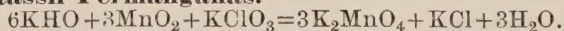
Potassii Ferrocyanidum.



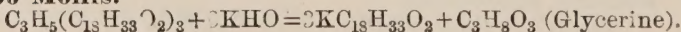
Potassii Iodidum.



Potassii Permanganas.



Sapo Mollis.



From Potassii Ferrocyanidum is prepared—

Potassii Cyanidum, KC_y , by heating as long as gas (nitrogen) is evolved.

Fused, decanted from the residue of Iron Carbide, cooled. Amorphous, deliquescent.

ARGOL, or Crude Tartar, the crust deposited on the interior of wine casks, consists of Acid Potassium Tartrate and Calcium Tartrate, with extractive and colouring matters.

Potassii Tartras Acida (*Cream of Tartar*), $\text{KHC}_4\text{H}_4\text{O}_6$, is separated from Argol by lixiviation, and purified by passing the solution through charcoal and clay.

Crystallizes out on evaporation. Gritty powder, or cakes crystallized on the surface.

Potassii Tartras, $\text{K}_2\text{C}_4\text{H}_4\text{O}_6$, is prepared by neutralizing a solution of the above in boiling water with Potassium Carbonate.

Crystallizes out on evaporation. Four or six-sided prisms.

PROPERTIES.

Solubility.

	Parts by weight of water, at 60° F.	Of water at 212° F.	Corresponding parts of Rect. Spirit.
P. Acetas is soluble in . . .	less than 1	...	3
Potassa	$\frac{1}{2}$	...	$\frac{1}{2}$
P. Citras	less than 1	...	—
P. Iodidum	" " "	...	16
P. Cyanidum	" " "	...	—
P. Carbonas	" " "	...	—
P. Tartras	" " "	...	—
P. Bromidum	2	...	90
P. Bicarbonas	3	...	—
P. Nitras	4	2 $\frac{1}{2}$	—
P. Sulphas	10	4	—
P. Chloras	16	2	—
P. Permanganas	16	(Decomposes)	(Decomposes)
P. Tartras Acida	200	18	—

Diffusion power is high in all, except

P. Sulphas, P. Tartras, P. Tartras Acida.

The following are **deliquescent** :—

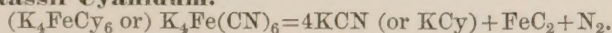
Potassa, P. Acetas, P. Carbonas, P. Citras.

The following are **corrosive** :—

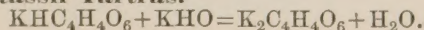
Potassa Caustica, P. Carbonas, P. Permanganas.

Potassa Caustica, and in a less degree P. Carbonas, *corrode* organic matters by reason of their affinity for water or its elements, and their power of dissolving nitrogenous substances.

Potassii Cyanidum.



Potassii Tartras.



P. Permanganas *corrodes* by parting with some of its oxygen, and decomposing into Manganate and Manganese Peroxide.*

P. Permanganas is also deoxidized by Sulphurous Acid, by solutions of Sulphides, and by acidulated solutions of Sulphites, Sulphosulphates (Hyposulphites), Nitrites, Arsenites, Ferrous and Mercurous Salts.

Potassii Chloras parts with oxygen readily at 752° F.; leaving Potassium Chloride and Perchlorate.† It parts with oxygen to Sulphur or Phosphorus on being rubbed forcibly with it.

Treated with Hydrochloric Acid it evolves Chlorine.‡

P. Sulphas is a very hard substance, and is used to aid in triturating other drugs finely.

The following are **fusible** :—

Potassa, P. Nitras, P. Chloras, P. Acetas, P. Iodidum, P. Bromidum.

The following are also **volatizable** :—

Potassa, P. Iodidum, P. Bromidum.

By heat—

P. Bicarbonas is reduced to Carbonate.

P. Carbonas is reduced to Oxide (K_2O).

P. Nitras is reduced to Nitrite, then to Oxide and Peroxide (K_2O_2).

P. Chloras is reduced to Chloride and Perchlorate (see above), then to Chloride.

P. Permanganas is reduced to Manganate and Manganic Peroxide, giving off Oxygen.

P. Acetas, Citras, Tartras, and Tartras Acida, are reduced to Carbonate, blackened by products of incomplete combustion. In the case of the last-named salt, the residue is known as "*black flux*."

P. Nitras and P. Chloras *deflagrate* on heating.

P. Bichromas is introduced only as an agent in making Sodii Valerianas and Chromic Acid.

P. Ferrocyanidum as the source of P. Cyanidum and Ac. Hydrocyan. Dil.

OFFICIAL PREPARATIONS.

Liquor Potassæ. (See above.)

Liquor Potassii Permanganatis. 1 part in 100, or about $\frac{1}{2}$ gr. in the drachm.

Liquor Potassæ Effervescens (*Potash Water*). 30 gr. of Pot. Bicarbonas in a pint of water, saturated with Carbonic Acid under a pressure of 4 atmospheres.

Trochisci Potassii Chloratis. 5 gr. in each.

Pilula Saponis Co. Opium in Castile Soap, nearly 1 gr. in 5.

Unguentum Potassii Iodidi. Nearly 1 in 9.

Unguentum Potassæ Sulphuratae. 1 in $15\frac{1}{2}$. Greenish grey.

Linimentum Potassii Iodidi cum Sapone. Pot. Iodidum, with Curd Soap, glycerine, and water, scented with Oil of Lemon. 1 part of Iodide in 9. Soft jelly, translucent.

* $K_2Mn_2O_8 = K_2MnO_4 + MnO_2 + O_2$.

† $2KClO_3 = KCl + KClO_4 + O_2$. At a red heat, $KClO_4$ gives $KCl + 2O_2$.

‡ $KClO_3 + 6HCl = KCl + 3H_2O + Cl_6$.

SODIUM COMPOUNDS. 24 *Officinal.***Sodium.—Sodii Ethylas.**

Sodii Chloridum (*Common Salt*) ... *Crude Sodium Sulphate.*

Sodii Sulphas

Sodii Carbonas.

Sodii Carbonas

Exsiccata ... **Sodii Arsenias.**

S. Bicarbonas.—**Sodii Citro-Tartras Effervescens.**

Soda ... **Sodii Iodidum.**
Sodii Bromidum.
Sapo Durus.
Sapo Animalis.
Sodii Valerianas.

Sodii Salicylas.

Sodii Sulphis.

Soda Tartarata.

Sodii Phosphas.

Sodii Hypophosphis.

S. Sulphocarbonas.

Soda Chlorinata.

SODA NITRE.—**Sodii Nitras.**

Borax.

The Ethylate and Chlorinated Soda are officinal only in solution.

Liquor Sodii Ethylatis is prepared by dissolving metallic **Sodium** in 20 parts of Absolute Alcohol, kept cool during the process. Hydrogen is evolved.

Syrupy liquid, becoming brown on heating.
 Contains 19 p.c. of Sodium Ethylate, $\text{NaC}_2\text{H}_5\text{O}$.

Sodii Chloridum (*Common Salt*), NaCl , is found in solution in sea-water and brine springs, from which it is separated by evaporation; and in solid deposits, as rock salt, from which it is obtained pure by solution and evaporation.

Crystallizes out in minute cubes.

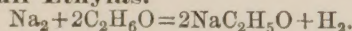
From Sodii Chloridum is prepared, by heating with Sulphuric Acid, a crude Sodium Sulphate, termed *Salt-cake*; Hydrochloric Acid (p. 95) being evolved.

From Salt-cake are obtained—

1. Sodii Sulphas, $\text{Na}_2\text{SO}_4 \cdot 10\text{H}_2\text{O}$ (free from impurities), by dissolving in water and evaporating.

Oblique rhombic prisms.

Sodii Ethylas.



- 2. Sodii Carbonas**, $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$, by heating in a reverberatory furnace with Chalk and Coal dust, lixiviating the resulting mass, and evaporating the solution thus obtained.

On heating *Salt cake* with Chalk and Carbon (coal dust),—(1) the sulphate is deoxidised to sulphide, and Carbonic Oxide is given off; (2) part of the Chalk is reduced to Quicklime; (3) the remainder undergoes mutual decomposition with the Sodium Sulphide, and *Ball Soda* is formed; *i.e.*, a mixture of *Sodium Carbonate*, Quicklime and Calcium Sulphide.

On lixiviation, a solution of *Sodium Carbonate* is obtained, but impure, as some Caustic Soda, NaHO , is formed by decomposition of the Carbonate with the Lime. On evaporation the pure Carbonate separates.

Rhombic crystals.

From Sodii Carbonas are prepared—

- 1. Sodii Carbonas Exsiccata**, Na_2CO_3 , by heating till all the water of crystallization is driven off.

Powdered.

- 2. Sodii Bicarbonas**, NaHCO_3 , by saturating it with Carbonic Anhydride.

Powder, or small scales.

- 3. Liquor Sodæ and Soda Caustica**, by similar processes to those of making Liq. Potassæ and Potassa Caustica (p. 116).

Similar appearance.

- 4. Sodii Salicylas**, $(\text{NaC}_7\text{H}_5\text{O}_3)_2\text{H}_2\text{O}$, by neutralizing with Salicylic Acid and crystallizing out.

Minute pearly scales.

- 5. Sodii Sulphis**, $\text{Na}_2\text{SO}_3 \cdot 7\text{H}_2\text{O}$, by neutralizing with Sulphurous Acid and crystallizing out.

Prisms. Efflorescent.

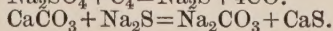
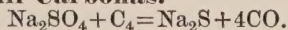
- 6. Soda Tartarata (Rochelle Salt)**, a double Tartrate of Potassium and Sodium, $\text{KNaC}_4\text{H}_4\text{O}_6 \cdot 4\text{H}_2\text{O}$, by neutralizing with a solution of Acid Tartrate of Potassium (p. 117) and crystallizing out.

Right rhombic prisms.

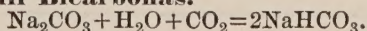
- 7. Sodii Phosphas (Hydric Disodic Phosphate)**, $\text{Na}_2\text{HPO}_4 \cdot 12\text{H}_2\text{O}$, by neutralizing with a solution of Acid Calcium Phosphate, prepared as in the making of Phosphorus, (p. 91) and crystallizing out.

Rhombic prisms.

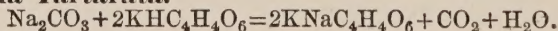
Sodii Carbonas.



Sodii Bicarbonas.



Soda Tartarata.



- 8. Sodii Hypophosphis**, NaPH_2O_2 , by adding it to a solution of Calcium Hypophosphite (p. 138) as long as a precipitate (of Calcium Carbonate) falls, filtering the solution, and evaporating to dryness.

Granules.

- 9. Sodii Sulphocarbolas**, $\text{NaC}_6\text{H}_5\text{SO}_4 \cdot 2\text{H}_2\text{O}$, by adding it to a solution of Barium Sulphocarbolate as long as a precipitate (of Barium Carbonate) falls, filtering the solution, and crystallizing out.

The solution of Barium Sulphocarbolate is made by dissolving Carbolie Acid in excess of Sulphuric Acid, supersaturating the liquid with Barium Carbonate, and filtering from Barium Sulphate and Carbonate,

Rhombic prisms.

- 10. Liquor Sodæ Chlorinatæ**, by dissolving in water, mixing with a solution of Calcium Chloride and Hypochlorite obtained from Calx Chlorinata (p. 138), and filtering from the Calcium Carbonate which is precipitated.

It contains Sodium Chloride and Hypochlorite (NaClO).

Colourless. Odour of Chlorine.

The properties of Liq. Sodæ Chlorinatæ are due to the Sodium Hypochlorite.

In contact with organic matter, the Hypochlorite parts with its oxygen, and becomes a Chloride.

Exposed to air which contains Carbonic Anhydride, Sodium Carbonate is slowly formed and Hypochlorous Acid liberated, which immediately decomposes, giving off free Chlorine.

In presence of a stronger acid, these changes take place rapidly.

From Sodii Carbonas Exsiccata is prepared—

Sodii Arsenias, $\text{Na}_2\text{HAsO}_4 \cdot 12\text{H}_2\text{O}$, by fusing with Arsenious Acid, As_2O_3 , and Sodium Nitrate; which yields Sodium Pyro-arsenate, $\text{Na}_4\text{As}_2\text{O}_7$; Carbonic and Nitrous Anhydrides being evolved.

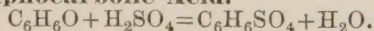
On partially cooling the fused Pyro-arsenate and dissolving in boiling water, the Arseniate is formed, and crystallizes out on evaporation.

Prisms. On exposure $5\text{H}_2\text{O}$ is given off, and the formula becomes $\text{Na}_2\text{HAsO}_4 \cdot 7\text{H}_2\text{O}$.

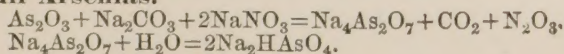
From Sodii Bicarbonas is prepared—

Sodii Citro-tartras Effervescens ("Granular Effervescent Citrate of Magnesia"), an uncombined mixture of the Bicarbonate with Citric and Tartaric Acids.

Sulphocarbolic Acid.



Sodii Arsenias.



17 parts of the first, 9 of the second, 5 of the third, and 5 of sugar are mixed, heated to 200° F., stirred till they aggregate into granules, and sifted.

Effervesces when placed in water, forming neutral Citrate and Tartrate of Sodium.

From Liquor Sodæ are prepared—

1. **Sodii Iodidum**, NaI, and
2. **Sodii Bromidum**, NaBr, in a similar manner to that by which the corresponding Potassium salts are prepared.
3. **Sodii Valerianas**, $\text{NaC}_5\text{H}_9\text{O}_2$, by saturating with it a liquid distilled from a mixture of Amyl Alcohol (p. 101) with Potassium Bichromate and Sulphuric Acid, containing Valeric Acid, $\text{C}_5\text{H}_{10}\text{O}_2$, and Amyl Valerate, $\text{C}_5\text{H}_{11}.\text{C}_5\text{H}_9\text{O}_2$.

The alkali combines with the Valeric Acid and decomposes the Amyl salt, forming Sodium Valerate, Amyl Alcohol, and water.

Cleared from the Amyl Alcohol, which floats on the surface, evaporated to dryness, fused, and cooled.

Amorphous masses. Odour of Valerian.

From Soda Caustica are prepared—

1. By boiling a solution of it with Olive Oil, **Sapo Durus** (*Castile Soap*), chiefly Sodium Oleate.

Washed from glycerine by a solution of Sodium Chloride.
Solid mass, greyish white.

2. By a similar process, employing purified Tallow, which contains 60 p.c. of glyceric Stearate, **Sapo Animalis** (*Curd Soap*), chiefly Sodium Stearate, $\text{NaC}_{18}\text{H}_{35}\text{O}_2$.

White.

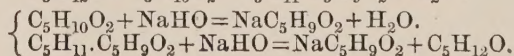
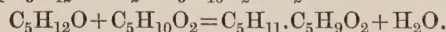
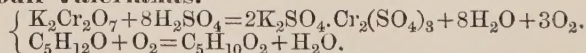
SODA-NITRE, a crude Sodium Nitrate, is found native in Peru. Purified by solution and crystallization, twice repeated, it forms **Sodii Nitras**, NaNO_3 .

Rhombohedra.

Borax (*Sodium Baborate*), $\text{Na}_2\text{B}_4\text{O}_7.10\text{H}_2\text{O}$., is found native in Thibet and Persia.

Purified by solution and crystallization.
Six sided prisms.

Sodii Valerianas.



PROPERTIES.

Solubility.

		Parts of water at 60° F.	Parts of water at 212° F.
Soda Caustica	} soluble in	1	...
S. Iodidum		...	...
S. Salicylas		...	...
S. Bromidum	"	$1\frac{1}{2}$	...
S. Carbonas	"	2	...
S. Tartarata	"	2	1
S. Arsenias	"	2	...
S. Hypophosphis	"	2	...
S. Chloridum	"	$2\frac{3}{4}$	...
S. Sulphas	"	3	4
S. Sulphis	"	4	...
S. Phosphas	"	5	2
S. Valerianas	"	5	...
S. Bicarbonas	"	10	...
Borax	"	12	2

The following are **soluble** in Rectified Spirit—

Soda Caustica, S. Valerianas, S. Hypophosphis, S. Iodidum, S. Salicylas.
Sapo Durus, Sapo Animalis.

Borax is soluble in 1 part of glycerine.

S. Hypophosphis is soluble in 2 parts of glycerine.

Two only are **deliquescent**.

Soda Caustica, Sodii Nitras.

Six are **efflorescent**.

S. Sulphas, S. Carbonas, S. Bicarbonas, S. Phosphas, Borax, S. Tartarata (slightly).

Solutions of S. Phosphas, S. Arsenias, and Borax have an *alkaline reaction*.

Effects of Heat.

The following lose their water of crystallization—

Borax, S. Carbonas, S. Acetas, S. Phosphas, S. Tartarata, S. Sulphas,
S. Sulphis, S. Arsenias.

The first five undergo "*aqueous fusion*" in so doing, *i.e.*, the salt dissolves in the separated water.

Dehydrated Borax is light and porous, and is known as "*Calcined Borax*."

The following are **fusible**—

Borax, Soda Caustica, S. Acetas, S. Valerianas, S. Chloridum.
The Soaps are softened.

Strongly Heated—

S. Nitras deflagrates.

S. Bicarbonas is reduced to (anhydrous) Carbonate.*

S. Acetas, S. Tartarata, S. Valerianas, and the Soaps are reduced to Carbonate, blackened by products of imperfect combustion.

S. Phosphas is reduced to Sodium Pyrophosphate, $\text{Na}_4\text{P}_2\text{O}_7$.

S. Arsenias is reduced to Pyro-arseniate, $\text{Na}_4\text{As}_2\text{O}_7$.

The Sodium Hypochlorite contained in Liq. Sodæ Chlorinatæ is decomposed into Chloride and Chlorate.†

* A solution of S. Bicarbonas loses Carbonic Acid on boiling.

† $3\text{NaClO} = 2\text{NaCl} + \text{NaClO}_3$.

8 parts of S. Sulphas with 5 of Acidum Hydrochloricum form a freezing mixture.

S. Caustica, S. Carbonas, and their solutions, act on organic matters in the same way as the corresponding Potassium Compounds.

Sodii Nitras is used only in making Sodii Arsenias.

Sodium " " " Liq. Sodii Ethylatis.

OFFICIAL PREPARATIONS.

Liquor Sodæ. See above.

Liquor Sodii Ethylatis. See above.

Liquor Sodæ Chlorinatæ. See above.

Liquor Sodii Arseniatis. 1 part in 100, or about $\frac{1}{2}$ gr. in the drachm.

Liquor Sodæ Effervescens (*Soda Water*). 30 gr. of Sod. Bicarbonas in a pint of water, saturated with Carbonic Acid under a pressure of 4 atmospheres.

Glycerinum Boracis. 9 gr. in the drachm.

Mel Boracis. 7 gr. in the drachm.

Trochisci Sodii Bicarbonatis. 5 gr. in each.

Linimentum Saponis (*Opodeldoc*). Castile Soap and Camphor dissolved in spirit, scented with Rosemary.

Emplastrum Saponis. Curd Soap, Rosin, and Lead Plaster.

Emplastrum Saponis Fuscum. Curd Soap boiled to dryness with a solution of Lead Subacetate, made by boiling Litharge in vinegar; mixed with bees-wax and olive oil by the aid of heat.

Cataplasma Sodæ Chlorinatæ. A poultice made from 4 oz. of Linseed-meal, with 2 oz. of *Liq. Sodæ Chlorinatæ* added.

AMMONIUM COMPOUNDS. 9 *Officinal.*

AMMONIACAL

LIQUOR.—

Ammonii Chloridum, or <i>Ammonium Sulphate.</i>	{	Ammonii Carbonas. — Ammonii Acetas.	
		{	Ammonii Citras.
			Ammonii Phosphas.
			Ammonii Benzoas.
			Ammonii Nitras.
			Ammonii Bromidum.

Ammonia, the Acetate and the Citrate, are not officinal in the solid form.

AMMONIACAL LIQUOR, a waste product of the manufacture of gas, contains Ammonia in combination with Carbonic and Hydrosulphuric acids.

Ammonii Chloridum (*Sal Ammoniac*), NH_4Cl , is obtained from this "liquor" by saturating it with Hydrochloric Acid. Carbonic Anhydride and Sulphuretted Hydrogen are given off; and on evaporation the Chloride crystallizes out nearly free from tarry matter.

Further purified by sublimation. Tough fibrous masses.

From Ammonii Chloridum, or a Sulphate similarly obtained, are prepared—

1. Liquor Ammoniae Fortior, by heating in a retort with slaked Lime, and carrying the resulting gaseous Ammonia into water to the point of saturation.

Colourless liquid, containing 32.5 p.c. of Ammonia, which is evolved abundantly on exposure.

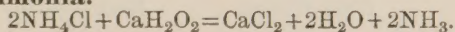
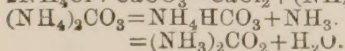
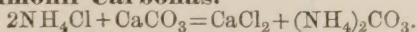
2. Ammonii Carbonas, by subliming from a mixture of either salt with Chalk.

The immediate result is neutral Ammonium Carbonate $(\text{NH}_4)_2\text{CO}_3$; but at the heat necessary for sublimation it is at once decomposed, with evolution of water and gaseous Ammonia; and the product actually consists of a mixture of the *Acid Carbonate* with *Ammonic Carbamate*, represented by the formula $2\text{NH}_4\text{HCO}_3 \cdot (\text{NH}_3)_2\text{CO}_2$.

Condenses in tough masses.

Exposed to air, the Carbonate passes off as Carbonic Anhydride and gaseous Ammonia, leaving the Acid Carbonate as an opaque porous mass or a fine powder, the "*mild Carbonate of Ammonia*" of the shops.

Similar results occur in presence of boiling water or alcohol.

Ammonia.**Ammonii Carbonas.**

From Ammonii Carbonas is prepared—

Liquor Ammonii Acetatis Fortior, by neutralizing with Acetic Acid, and diluting to a stated degree.

Colourless.

Contains a little free Carbonic Acid, which improves the flavour.

The remaining Ammonium Compounds are formed by simple processes of neutralization, as follows:—

- 1. Liquor Ammonii Citratis Fortior**, by neutralizing Liq. Amm. Fort. with Citric Acid, and diluting to a stated degree.

Colourless.

- 2. Ammonii Phosphas**, $(\text{NH}_4)_2\text{HPO}_4$, by neutralizing Liq. Amm. Fort. with Acid. Phosph. Dil., and crystallizing out.

Dried quickly. Prisms.

- 3. Ammonii Benzoas**, $\text{NH}_4\text{C}_7\text{H}_5\text{O}_2$, by neutralizing diluted Liq. Ammonia with Benzoic Acid, and crystallizing out,

Laminae.

- 4. Ammonii Nitras**, NH_4NO_3 , by neutralizing diluted Nitric Acid with Liq. Ammonia or Amm. Carbonas, evaporating till crystals form, and fusing the crystals at 320°F. to render them anhydrous.

Confused crystalline masses.

Deliquescent.

- 5. Ammonii Bromidum**, by neutralizing Hydrobromic Acid with some form of Ammonia, and crystallizing out.

Small crystals.

Becomes yellowish on exposure.

PROPERTIES.

Solubility.

	Parts of Cold Water.		Parts of Rect. Spirit.
Amm. Bromidum, soluble in	$1\frac{1}{2}$	...	13
Amm. Phosphas	2	...	—
Amm. Chloridum	4	...	55
Amm. Carbonas	4	...	200
Amm. Benzoas	5	...	18

Amm. Chloridum, Bromidum, Carbonas, Benzoas, **sublime** unchanged.

Amm. Phosphas is **decomposed** by heat.

Amm. Carbonas is **decomposed** by boiling water or alcohol.

Ammonia in solution exercises an **action on organic matters** similar to that of Potassa and Soda.

Amm. Phosphas is a **solvent** for Sodium or Calcium Urate.

Ammonii Nitras is used only as a source of Nitrous Oxide. For this reason it is required in the anhydrous form.

OFFICINAL PREPARATIONS.

Liquor Ammoniaë Fortior.

Liquor Ammonii Citratis Fortior.

Liquor Ammonii Acetatis Fortior.

} See above.

Liquor Ammoniaë. The strong solution, diluted to one-third the strength.

Liquor Amm. Citratis. The strong solution, diluted to one-fifth the strength.

Liquor Amm. Acetatis (*Mindererus Spirit*). The strong solution, diluted to one-sixth the strength.

Spiritus Ammoniaë Aromaticus (*Sal Volatile*). A solution of Amm. Carbonas in spirit and Liq. Amm. Fortior, flavoured with Oils of Nutmeg and Lemon.

Spiritus Ammoniaë Fœtidus. A mixture of Liq. Amm. Fortior with a spirituous distillate from Asafoetida.

Linimentum Ammoniaë (*Hartshorn and Oil*). Liq. Ammoniaë, with 3 parts of Olive Oil.

An Ammonia Soap is produced, which forms an emulsion with the rest of the oil.

IRON COMPOUNDS. 17 *Officinal.*

Ferrum.	{	Ferri Iodidum.	{	F. Sulphas Exsiccata.	{	F. Acetas.*
		Ferri Sulphas.		F. Carbonas.		Ferrum Tartaratum.*
		F. Pernitras.*		F. Phosphas.		F. et Ammoniae Citras.
		Vinum Ferri.*		F. Arsenias.		F. et Quiniae Citras.*
				F. Persulphas.*		
				...F. Peroxidum.*		
		F. Perchloridum.	{	Liq. Ferri Dialysatus.		
			{	Ferrum Redactum.		

* Ferric Salts; the rest being Ferrous Salts.

The Persulphate, Pernitrate, and Acetate are officinal only as solutions, the Iodide only in Syrup and Pill; the salts contained in V. Ferri, and Liq. F. Dialysatus are not officinal in the separate form.

Ferrum is Wrought Iron in the form of fine wire, or nails, *i.e.*, the purest obtainable.

From Ferrum are prepared—

- 1. Syrupus Ferri Iodidi**, by digesting Iron and Iodine in a flask with warm water, boiling with a little syrup, and filtering while hot into syrup.

Colourless.

Each drachm contains 4·3 gr. of Ferrous Iodide, FeI_2 .

Pilula Ferri Iodidi, by shaking Iron and Iodine with water in a phial, pouring on sugar and triturating with Liquorice.

1 gr. of the Iodide in 3 gr.

- 2. Ferri Sulphas**, $\text{FeSO}_4 \cdot 7\text{H}_2\text{O}$, by dissolving in diluted Sulphuric Acid, boiling towards the end of the process, filtering the solution and allowing it to cool.

The Sulphate crystallizes out.

Oblique rhombic prisms, bluish green.

Ferri Sulphas Granulata (same composition), by the same process, the solution being filtered into Rectified Spirit.

The salt, being insoluble in spirit, is precipitated in minute crystals. Pale bluish green.

- 3. Liquor Ferri Pernitratis**, by dissolving in diluted Nitric Acid, and reducing the filtered solution to a stated degree.

Reddish brown.

Contains Ferric Nitrate, $\text{Fe}_2(\text{NO}_3)_6$.

- 4. Liquor Ferri Perchloridi Fortior**, by dissolving in diluted Hydrochloric Acid with the aid of heat, which yields *Ferrous* Chloride, FeCl_2 ; adding more Hydrochloric Acid to the filtered solution, and pouring on to Nitric Acid, which oxidises the dissolved salt to form *Ferric* Chloride, Fe_2Cl_6 ; evaporating till nitrous fumes cease to come off, adding a little more Hydrochloric Acid, and diluting to a stated degree.

Dark orange brown liquid.

Each drachm contains 23 gr. of Ferric Chloride.

- 5. Vinum Ferri**, containing a little Ferric Tartrate, Malate, &c., by macerating in Sherry for thirty days, the iron being not wholly immersed and the vessel frequently opened and shaken.

Filtered. Brown.

From Ferri Sulphas are obtained—

- 1. Ferri Sulphas Exsiccata** (*Dehydrated Sulphate*), $\text{FeSO}_4 \cdot \text{H}_2\text{O}$, by heating until all the separable water of crystallization is driven off.

Powdered. Whitey-brown.

- 2. Ferri Carbonas Saccharata**, by mixing its solution with one of Ammonii Carbonas in a deep cylindrical vessel, collecting and washing the precipitate, mixing with sugar and drying.

The precipitate consists of a mixture of hydrated Ferrous Carbonate, $\text{FeCO}_3 \cdot x\text{H}_2\text{O}$, with some Ferric Oxide, Fe_2O_3 .

Small lumps, brownish grey.

Contains about $\frac{1}{3}$ of Carbonate.

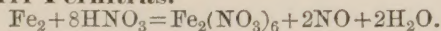
- 3. Ferri Phosphas**, by mixing its solution with one of *Sodii Phosphas*, and adding a little *Sodii Bicarbonas*. The precipitate contains 47 p.c. of Ferrous Phosphate, $\text{Fe}_3(\text{PO}_4)_2 \cdot 8\text{H}_2\text{O}$, with Ferric Phosphate and some Oxide.

(*Sodii Phosphas* being an acid salt, and Ferrous Phosphate a neutral one, a little Sulphuric Acid is set free by the reaction. The Bicarbonate is added to neutralise the Acid, as Phosphate of Iron is soluble in it.)

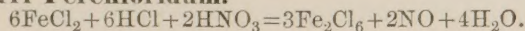
Collected, washed, dried at 120°F .

Amorphous powder, slate blue.

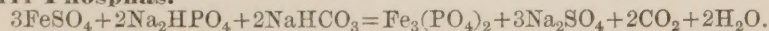
Ferri Pernitras.



Ferri Perchloridum.



Ferri Phosphas.



- 4. Ferri Arsenias**, by a similar process, using Sodii Arsenias for Sodii Phosphas. The precipitate is chiefly Ferrous Arseniate, $\text{Fe}_3(\text{AsO}_4)_2$.

(Sodii Arsenias is also an acid salt.)

Dried at 100°F . Amorphous powder, slate blue.

- 5. Liquor Ferri Persulphatis**, by mixing its solution with Sulphuric and Nitric Acids, by which means it is oxidized to *Ferric* Sulphate, $\text{Fe}_2(\text{SO}_4)_3$, concentrating until the Nitric Oxide which is formed in the process is suddenly disengaged and the black colour of the liquid changes to red, and reducing to a stated strength.

Dark red.

Each drachm contains 24 gr. of Ferric Sulphate.

From Liquor Ferri Persulphatis is prepared—

Ferri Peroxidum Hydratum, $\text{Fe}_2\text{O}_3 \cdot \text{H}_2\text{O}$, by pouring it into Liquor Sodæ, and drying the washed precipitate at 212°F .

Powdered; reddish brown.

The precipitate, before drying, has the composition, $\text{Fe}_2\text{O}_3 \cdot 3\text{H}_2\text{O}$.

And from Ferric Hydrate, precipitated when required by pouring diluted Liq. F. Persulph. into diluted Liq. Ammoniaë, are prepared—

- 1. Liquor Ferri Acetatis Fortior**, by dissolving in glacial Acetic Acid, and diluting to a stated degree.

Deep red.

Each drachm contains about 7 gr. of *Ferric Acetate*, $\text{Fe}_2(\text{C}_2\text{H}_3\text{O}_2)_6$.

- 2. Ferrum Tartaratum** (*Ferric Potassic Tartrate*), $\text{K}_3\text{Fe}(\text{C}_4\text{H}_4\text{O}_6)_3$, by mixing with Cream of Tartar, $\text{KHC}_4\text{H}_4\text{O}_6$, standing for 24 hours, and heating to 140°F .

Dissolved out, filtered, evaporated at 140°F . to a syrupy consistence, spread on glass and dried at 100° .

Thin transparent scales, garnet colour.

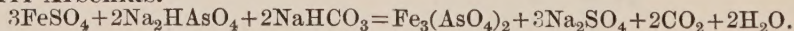
- 3. Ferri et Ammonii Citras**, by saturating with it a solution of Citric Acid, adding Liq. Ammoniaë, evaporating and drying as above.

Similar aspect.

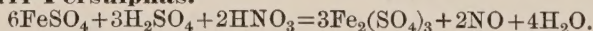
- 4. Ferri et Quininaë Citras**, by dissolving in a solution of Citric Acid, adding freshly precipitated Quinine, which is also dissolved, neutralizing with diluted Liq. Ammoniaë, evaporating and drying as above.

Similar scales, greenish yellow.

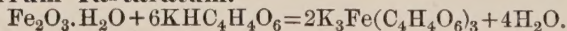
Ferri Arsenias.



Ferri Persulphas.



Ferrum Tartaratum.



From Liq. Ferri Perchlor. Fort. are prepared—

- 1. Liquor Ferri Dialysatus**, a solution of basic Ferric Oxychloride, by precipitating Ferric Hydrate from six parts of the above *Liquor* (diluted) with diluted Liq. Ammonia, washing the precipitate, dissolving it in one part of the *Liquor*, and washing the solution free from acidulous matter on a dialyser.

Reddish brown. Almost tasteless.

Each drachm contains about 22 gr. of the Oxychloride.

- 2. Ferrum Redactum**, finely divided Metallic Iron, by pouring the *Liquor* (diluted) into excess of diluted Liq. Ammonia, from which a precipitate of Ferric Oxyhydrate results, and heating the washed and dried precipitate to a strong red heat in an iron tube through which hydrogen gas is passed, as long as watery vapour is given off.

Dark grey powder, strongly magnetic, as it contains some magnetic oxide.

PROPERTIES.

F. et Amm. Citras is *soluble* in $\frac{1}{2}$ part by weight of water.

F. et Quininae „ „ $\frac{1}{2}$ „ „ „

F. Sulphas „ „ $1\frac{1}{2}$ „ „ „

F. Tartaratum „ „ 4 „ „ „

F. Tartaratum is sparingly soluble in Rectified Spirit; the other salts above named are practically insoluble in Rectified Spirit. Ferri Sulphas is insoluble even in Proof Spirit. (See “F. Sulphas Granulata.”)

Ferri Phosphas is soluble in Acids; Ferri Arsenias in Hydrochloric Acid. Reduced Iron, the Oxides, and the Carbonate are insoluble.

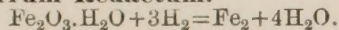
The solutions described above are miscible in all proportions with water and Rectified Spirit.

Exposed to air—

F. Sulphas becomes coated with a yellow insoluble oxysulphate.

The Iodide in solution slowly decomposes into Iodine and Ferric Oxide; depositing a rusty sediment and colouring the solution brown. A coil of iron wire extending throughout the vessel prevents this coloration, fresh iodide being continually formed.

Liquor Ferri Persulphatis is introduced only to prepare the Peroxide.

Ferrum Redactum.

OFFICIAL PREPARATIONS.

Liquor Ferri Dialysatus	} See above.
Liquor Ferri Perchloridi Fortior	
Liquor Ferri Acetatis Fortior	
Liquor Ferri Pernitratis	
Liquor Ferri Persulphatis	

Liquor Ferri Perchloridi	} The strong solution, diluted to one-fourth the strength.
Liquor Ferri Acetatis	

Tinctura Ferri Perchloridi	} Do., the medium being spirit and water.
Tinctura Ferri Acetatis	

To the latter some Acetic Acid is added for preservation.

Vinum Ferri. See above.

Vinum Ferri Citratis. F. et Amm. Citras in Orange Wine, 1 gr. in each drachm.

Both deep reddish brown.

Syrupus Ferri Iodidi. See above.

Syrupus Ferri Phosphatis. The Phosphate dissolved in Syrup acidulated with Phosphoric Acid. 1 gr. in each drachm.

Both colourless.

Pilula Aloës et Ferri. F. Sulphas and Barbadoes Aloes with Pulv. Cinn. Co. and Confection of Roses. $\frac{3}{4}$ gr. of the salt and 1 of the Aloes in 5 gr.

Pilula Ferri Carbonatis. F. Carb. Sacch. with Confection of Roses. 1 gr. in 5.

Pilula Ferri Iodidi. See above.

Trochisci Ferri Redacti. 1 gr. in each.

Emplastrum Ferri. F. Perox. Hydr. with Burgundy Pitch and Lead Plaster. Red.

Mistura Ferri Co. A solution of Ferrous Sulphate in Rose-water, added to a milky fluid obtained by rubbing Potassium Carbonate, Myrrh, and sugar with Rose-water and spirit of Nutmeg. Ferrous Carbonate is precipitated and suspended by the "resin soap" that the Potash (which is in excess) forms with the Myrrh.

$2\frac{1}{2}$ gr. of Ferri Sulphas to the fl. oz.

Bluish green.

Mistura Ferri Aromatica. An infusion of Cinchona, Calumba, and Cloves in Peppermint water, macerated on Iron wire, flavoured with Tr. Cardam Co. and Tincture of Orange-peel.

Contains very little iron.

Dark brown.

MERCURIAL COMPOUNDS. 11 *Officinal.*

Hydrargyrum.	{	Hydrargyri		
		Nitras.		
		H. Oxidum		
		Rubrum.		
		H. Persulphas.	...	
			{	H. Subchloridum.*—Mercurous Oxide.
			{	H. Oxidum
				Flavum.—H. Oleatum.
				H. Iodidum
				Rubrum.
				Hydrargyrum
				Ammoniatum.

* Mercurous Salt, the rest being Mercuric.

The Nitrate is officinal only as a solution; Mercurous Oxide as Lotio Nigra.

Hydrargyrum.—Metallic Mercury, found native; or extracted from Cinnabar, a native Mercuric Sulphide, by simple roasting, or by distilling with Caustic Lime, which gives Mercury, Calcium Sulphide, and Calcium Sulphate.

Purified, if necessary, by redistillation.

From Hydrargyrum are prepared—

- 1. Liquor Hydrargyri Nitratis Acidus**, by dissolving in diluted Nitric Acid in stated proportion, and boiling to expel Nitric Oxide.

Colourless.

Contains Mercuric Nitrate, $\text{Hg}(\text{NO}_3)_2$, and free Nitric Acid.

- 2. Hydrargyri Oxidum Rubrum** (*crystalline Mercuric Oxide*), HgO , by triturating the metal with dry Mercuric Nitrate, prepared as above and evaporated to dryness, and subsequently heating.

Nitric Peroxide is evolved on heating.

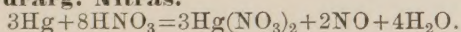
Crystalline powder, orange red.

- 3. Hydrargyri Persulphas** (*Mercuric Sulphate*), HgSO_4 , by dissolving in Sulphuric Acid with the aid of heat, and evaporating to dryness.

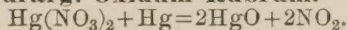
Crystalline powder, nearly white.

Turns yellow on adding water.

Hydrarg. Nitras.



Hydrarg. Oxidum Rubrum.



From Hydrargyri Persulphas are prepared—

- 1. Hydrargyri Subchloridum** (*Mercurous Chloride, or Calomel*), Hg_2Cl_2 , by mixing with Chloride of Sodium and Metallic Mercury, and subliming into a large chamber.

Washed from Mercuric Chloride (a little may be formed in the process), and dried at 212°F .

Heavy powder, dull white.

- 2. Hydrargyri Perchloridum** (*Mercuric Chloride, or Corrosive Sublimate*), HgCl_2 , by mixing with Chloride of Sodium and Black Oxide of Manganese, and subliming.

The Black Oxide sets free a little Chlorine, which prevents the accidental formation of Calomel.

Masses of prismatic crystals.

From Hydrargyri Subchloridum is prepared—

Lotio Hydrargyri Nigra (*Black Wash*), a watery suspension of Mercurous Oxide, Hg_2O , by adding 30 gr. to half-a-pint of Liquor Calcis.

From Hydrargyri Perchloridum are prepared—

- 1. Lotio Hydrargyri Flava** (*Yellow Wash*), a similar suspension of Mercuric Oxide, HgO , by adding 18 gr. to half-a-pint of Liquor Calcis.

Hydrargyri Oxidum Flavum, Mercuric Oxide in a finely precipitated powder, by pouring its solution into Liquor Sodæ.

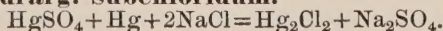
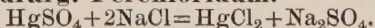
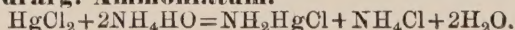
Separated, washed, dried at 212°F . Fine yellow powder.

- 2. Hydrargyri Iodidum Rubrum**, a similar precipitate of Mercuric Iodide, HgI_2 , by mixing its solution with one of Potassium Iodide.

Washed and dried, as above. Fine powder, brilliant red.

- 3. Hydrargyrum Ammoniatum** (*White Precipitate, or Mercur-Ammonium Chloride*), NH_2HgCl , by pouring its solution into Liq. Ammonia.

Washed and dried, as above. White powder.

Hydrarg. Subchloridum.**Hydrarg. Perchloridum.****Hydrarg. Ammoniatum.**

From Hydrargyri Oxidum Flavum is prepared—

Oleatum Hydrargyri, Mercuric Oleate in Oleic Acid, by triturating with 9 parts of Oleic Acid.

Semi-solid, oleaginous, light brown.

PROPERTIES.

Hydrarg. Perchloridum (Corrosive Sublimate) is **soluble** in 20 parts of water or 7 parts of Rectified Spirit. Also in ether.

Hydrarg. Iodidum Rubrum is **soluble** in ether, and slightly in Rectified Spirit. It is soluble in solutions of Corrosive Sublimate, of Iodide of Potassium, or of Chloride of Sodium.

The Oxides, the Subchloride, and White Precipitate, are **insoluble** in water, alcohol, or ether.

The Persulphate, in presence of water, forms a yellow basic sulphate.

When **heated** gently,

The Red Iodide turns yellow.

Metallic Mercury and its compounds are volatilized at a heat below redness. The Oxides are decomposed at the same time.

Metallic Mercury volatilizes slowly at ordinary temperatures. It boils at 662° F., and freezes at —39.

Sp. gr. of Metallic Mercury, 13.5.

Solutions of Corrosive Sublimate coagulate albumen, harden and contract animal tissues, and preserve them from putrefaction.

Hydrarg. Persulphas is introduced only to prepare the Chlorides.

OFFICINAL PREPARATIONS.

Hydrargyrum cum Cretâ. Mercury triturated with twice its weight of chalk till globules cease to be visible.

Light grey.

Liquor Hydrargyri Nitratis Acidus. (See above.)

Liquor Hydrargyri Perchloridi. $\frac{1}{18}$ gr. in the drachm, with the same amount of Amm. Chloridum.

Oleum Hydrargyri. (See above.)

Pilula Hydrargyri. Metallic Mercury, with Confection of Roses and Liquorice Root; 1 gr. in 3.

Pilula Hydrargyri Subchloridi Co. Calomel and Antim. Sulphuratum (1 gr. of each in 5), with Guaiac Resin and Castor Oil.

Unguentum Hydrargyri. Nearly 1 in 2 (of metallic Mercury).
Bluish grey.

Unguentum Hydrargyri Co. About 1 in $4\frac{1}{2}$ (of metallic Mercury) with Camphor.
Bluish grey.

Unguentum Hydrargyri Ammoniat. 1 in 10.

Unguentum Hydrargyri Iodidi Rubri. 1 in 28.
Bright scarlet.

Unguentum Hydrargyri Nitratis. 1 in 15.
Lemon yellow.

Unguentum Hydrargyri Nitratis Dilutum. 1 in 45.

Unguentum Hydrargyri Oxidi Rubri. 1 in 8.
Dull red.

Unguentum Hydrargyri Subchloridi. 1 in $6\frac{1}{2}$.
Cream colour.

Linimentum Hydrargyri. Equal parts of Ung. Hydrargyri, Liq. Ammoniae, and Lin. Camphoræ.
Creamy, bluish grey. 1 part of Mercury in 6.

Emplastrum Hydrargyri. Mercury triturated with oil in which Sulphur is dissolved, added to Lead Plaster.
Blue.

Emplastrum Ammoniaci cum Hydrargyro. The same, Ammoniacum being substituted for Lead Plaster.
Brownish grey.

Suppositoria Hydrargyri. 5 gr. of Ung. Hydrargyri; $2\frac{1}{2}$ of Mercury in each.

Lotio Hydrargyri Flava. }
Lotio Hydrargyri Nigra. } See above.

CALCIUM COMPOUNDS. 13 *Officinal.*

Os Ustum ...	...	Calcii Phosphas.
(<i>Bone Ash</i>)		
Creta ...	...	{ Creta Præparata.
(<i>Chalk</i>)		{ Calcii Chloridum.—Calcii Carbonas Præcipitata.
LIMESTONE ...	...	Calx.—Calcii Hydras. { Calcii Hypophosphis.
		{ Calx Chlorinata.
Marmor Album		
(<i>Marble</i>)		
GYP SUM ...	...	Calcii Sulphas.—Calx Sulphurata.

BONE ASH (*Os Ustum*), the residue left after burning bones in air, or igniting used animal charcoal, consists of *Tricalcic Phosphate* (**Calcii Phosphas**), $\text{Ca}_3(\text{PO}_4)_2$, with about 10 per cent. of Calcium Carbonate, both insoluble salts.

From Bone Ash is obtained—

Calcii Phosphas, by digesting in Hydrochloric Acid, which drives off Carbonic Anhydride and yields a solution of Calcium Chloride and Acid Phosphate, $\text{H}_4\text{Ca}(\text{PO}_4)_2$, and reprecipitating the neutral Phosphate from the latter by adding Liquor Ammonia.

(Ammonium Chloride and some Calcium Chloride remains in the solution.)
Collected, washed, dried at 212°F . Amorphous powder.

Creta, native Chalk, consists of Calcium Carbonate, contaminated with Ferrous Carbonate.

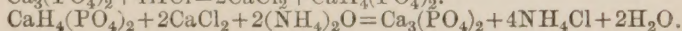
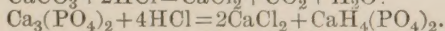
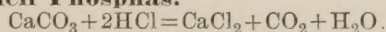
From Creta are prepared—

1. Creta Præparata (*prepared Chalk*), by washing out from coarser impurities (*elutriation*) and drying.

Amorphous powder, aggregated into cones.

2. Calcii Chloridum, by adding Hydrochloric Acid to neutrality, which yields a solution of Calcium Chloride, CaCl_2 , contaminated by Ferrous Chloride. On adding a little Chlorinated Lime (p. 138) and slaked Lime, the Ferrous salt is converted by the former into a Ferric salt, and precipitated by the latter as Ferric Hydrate, leaving the solution pure.

Filtered, evaporated to solidity, dried at 400°F .
Agglutinated masses.

Calcii Phosphas.

From Calcii Chloridum is prepared—

Calcii Carbonas Præcipitata (pure Carbonate, CaCO_3), by mixing its solution with one of Sodium Carbonate, washing the precipitate, and drying at 212°F .

Crystalline powder.

LIMESTONE is a native concrete Calcium Carbonate.

On ignition in a kiln, Carbonic Anhydride is driven off, and **Calx** (*Caustic Lime*), CaO , remains.

Porous masses.

From Calx is prepared—

Calcii Hydras (*Slaked Lime*), CaH_2O_2 , by the addition of water, half a pint to the pound.

Heat is evolved in the process.

Sifted. Amorphous powder.

From Calcii Hydras are prepared—

- 1. Calcii Hypophosphis**, $\text{Ca}(\text{H}_2\text{PO}_2)_2$, by heating with half its weight of Phosphorus in water as long as Phosphuretted Hydrogen is evolved, filtering the solution, separating uncombined Lime by passing Carbonic Anhydride, and crystallizing out.

Pearly crystals.

- 2. Calx Chlorinata** ("*Chloride of Lime*," *Bleaching Powder*), by exposure to Chlorine gas as long as it is absorbed.

It consists chiefly of Calcium Chloride and Hypochlorite, the latter being the active agent.

Dull white powder.

Similar properties to those of Soda Chlorinata (p. 121).

Marmor Album (*White Marble*), a native concrete Calcium Carbonate, is used as a source of Carbonic Anhydride.

From GYPSUM (native Calcium Sulphate, $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$), **is prepared** by heating—

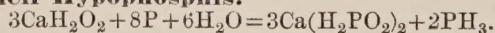
Calcii Sulphas, Calcium Sulphate, nearly anhydrous.

White powder.

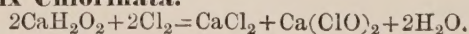
From Calcii Sulphas is prepared—

Calx Sulphurata, by heating to redness with Charcoal.

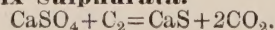
Calcii Hypophosphis.



Calx Chlorinata.



Calx Sulphurata.



Part of the Sulphate is reduced to Sulphide, CaS.

Powder, nearly white. Odour of Sulphuretted Hydrogen.

50 p.c. is Calcium Sulphide, the rest consists of other sulphur compounds.

PROPERTIES.

Calcii Chloridum is **soluble** in 2 parts of water, also in Rectified Spirit.

Calcii Hypophosphis in 8 parts of water; not in Rectified Spirit.

Calcii Hydras in about 900 parts of water; much more freely in syrup; not in Rectified Spirit.

Calx Chlorinata is partially soluble in water.

The Carbonate, Sulphate, and Phosphate are insoluble; the last, with acids, yields a soluble Acid Phosphate (see above).

Exposed to air, Calx absorbs water, forming the Hydrate; Calx and Calcii Hydras and their solutions absorb Carbonic Anhydride, forming the Carbonate.

Calcii Chloridum is fusible.

Calcii Hypophosphis is decomposed at a red heat.

OFFICIAL PREPARATIONS.

Pulvis Cretæ Aromaticus. Powdered Cinnamon, Nutmeg, Saffron, Cloves, and Cardamoms, with sugar and chalk,—1 part of Chalk in 4.

Yellow.

Pulvis Cretæ Aromaticus cum Opio. The same, with one-fortieth part of powdered Opium.

Liquor Calcii Chloridi. 1 part in 6.

Liquor Calcis:—Saturated;—about $\frac{1}{16}$ gr. of Calcii Hydras in the drachm.

Liquor Calcis Saccharatus:—About 1 gr. of Calcii Hydras in the drachm, dissolved by the aid of sugar.

Liquor Calcis Chlorinatæ:—Made with $5\frac{1}{4}$ gr. of Calx Chlorinata to the drachm. Contains the soluble ingredients, the Hypochlorite and Chloride.

Linimentum Calcis (*Carron Oil*). Equal parts of Liq. Calcis and Olive Oil.

A soap is formed, which forms an emulsion with the rest of the oil.
Creamy.

Mistura Cretæ. Prepared Chalk, suspended by gum and syrup in Cinnamon water. About 13 gr. in the fl. oz.

Vapor Chlori. See p. 10.

ZINC COMPOUNDS. 10 *Officinal*.

Zincum.—Z.

Granulatum. { Z. Chloridum.
Z. Sulphas.{ Z. Valerianas.
Z. Carbonas.{ Z. Acetas.
Z. Oxidum.

Calamina Præparata.

{ Z. Sulpho-
carbolas.
Z. Oleatum.

Zincum is commercial Zinc. Fused and poured into cold water, it solidifies in crumpled fragments, and forms **Zincum Granulatum**. It is still, as a rule, contaminated with Iron and Lead.

From **Zincum Granulatum** are prepared—

- 1. Liquor Zinci Chloridi.** The metal is dissolved by the aid of heat in diluted Hydrochloric Acid, yielding a solution of Zinc Chloride, contaminated, as a rule, with a little Ferrous Chloride and Lead Chloride.

A few drops of the solution are tested for these metals by adding excess of Ammonia and then Ammonium Sulphide.

If a black precipitate denotes their presence, Chlorine is added to the solution (after filtering) to convert Ferrous Salt into Ferric, and Zinc Carbonate slowly stirred in to precipitate the Iron and Lead as oxides.

The solution, now containing only pure Zinc Chloride, is again filtered and evaporated to a stated degree.

Colourless.

Contains 25 gr. of Zinc Chloride in the drachm.

Zinci Chloridum, ZnCl_2 , by evaporating the *Liquor* till only a fused salt remains, and running into moulds.

Moulded sticks.

- 2. Zinci Sulphas**, $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$, by a similar process; crystallizing the salt out of the solution.

In this case the only impurity in the solution is Iron, Lead Sulphate not being soluble.

Small slender prisms.

From **Zinci Sulphas** are prepared—

- 1. Zinci Valerianas**, $\text{Zn}(\text{C}_5\text{H}_9\text{O}_2)_2$, by mixing a boiling solution with one of Sodii Valerianas (p. 122), and cooling.

Separates in pearly tables. More are obtained on concentrating the mother liquor at a temperature not over 200° . Drained and dried. Odour of Valerian.

- 2. Zinci Carbonas** (*Basic Zinc Carbonate*), $\text{ZnCO}_3 \cdot 2\text{ZnO} \cdot 3\text{H}_2\text{O}$, by mixing its solution with one of Sodium Carbonate. Carbonic Anhydride is evolved.

Boiled ; precipitate collected by decantation, washed and dried.
White powder.

From Zinci Carbonas are prepared—

- 1. Zinci Acetas**, $\text{Zn}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot 2\text{H}_2\text{O}$, by dissolving in diluted Acetic Acid with the aid of gentle heat, boiling to expel Carbonic Anhydride, and filtering.

Crystallizes out on cooling.
More crystals on evaporating the mother liquor.
Thin plates.

- 2. Zinci Oxidum**, ZnO , by exposing to a dull red heat, water and Carbonic Anhydride being driven off.

White powder ; becomes yellow on heating.

From Zinci Oxidum are prepared—

- 1. Zinci Sulphocarbolas**, $\text{Zn}(\text{C}_6\text{H}_5\text{SO}_4)_2 \cdot \text{H}_2\text{O}$, by saturating with it Sulphocarbolic Acid made as in preparing Sodii Sulphocarbolas (p. 121), and crystallizing out.

Tabular crystals, efflorescent.

- 2. Oleatum Zinci**, by heating with 9 parts of Oleic Acid.

Oleaginous, light brown.

Calamina Præparata is native Calamine (Zinc Carbonate) calcined at a moderate temperature, powdered, and freed from grit by elutriation.

Pale pinkish powder.

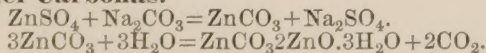
PROPERTIES.

Solubility.

	Parts of cold water.	Parts of boiling water.	Parts of Rect. Sp.
Zinci Chloridum soluble in	less than one	—	—
Zinci Sulphas ,,	$2\frac{1}{3}$	less than one	—
Zinci Acetas ,,	$2\frac{1}{2}$	” ”	—
Zinci Valerianas ,,	120	— ”	60

The Oxide and Carbonate are insoluble.

Zinci Carbonas.



Zinci Chloridum is **deliquescent**.

Zinci Sulphas **effloresces** in dry air.

Heated gently,

Zinci Oxidum turns yellow.

Heated more strongly,

Zinci Sulphas and Acetas are dehydrated; the former undergoing "watery fusion."

Heated strongly,

Zinci Sulphas, Acetas, Valerianas, and Carbonas are decomposed, leaving the Oxide.

Zinci Chloridum forms insoluble compounds with albumen and gelatine. It accordingly preserves organic substances from putrefaction; and, applied to living tissues, produces an eschar.

OFFICINAL PREPARATIONS.

Liquor Zinci Chloridi. (See above.)

Unguentum Calaminæ. 1 in 6.

Unguentum Zinci. 1 in $6\frac{1}{2}$ (of Z. Oxidum).

Unguentum Zinci Oleati. Equal parts of Oleate and Vaseline.

LEAD COMPOUNDS. 6 *Officinal*.

LEAD. { **Plumbi Oxidum.** — **Plumbi Acetas.** — **Plumbi Subacetas.** — **Plumbi**
 { **Plumbi Nitras.** — **Plumbi Iodidum.** [Carbonas.]

The Sub-acetate is officinal only as a solution.

From Metallic Lead are obtained—

1. **Plumbi Oxidum** (*Litharge*), PbO , by heating in a current of air at a temperature sufficient to fuse the product.

Heavy scales, brick red.

2. **Plumbi Nitras** $\text{Pb}(\text{NO}_3)_2$, by dissolving in diluted Nitric Acid, and crystallizing out.

Octahedra.

From Plumbi Oxidum is prepared—

Plumbi Acetas (*Sugar of Lead*), $\text{Pb}(\text{C}_2\text{H}_3\text{O}_2)_2 \cdot 3\text{H}_2\text{O}$, by dissolving in diluted Acetic Acid,* and crystallizing out.

The solution must be kept acid during evaporation by addition of Acetic acid. Masses of acicular crystals.

From Plumbi Acetas is prepared—

Liquor Plumbi Subacetatis (*Goulard's Extract*) by boiling in water with Litharge, and diluting to a stated strength.

A solution of Basic Acetate of Lead, $\text{Pb}(\text{C}_3\text{H}_3\text{O}_2)_2 \cdot 2\text{PbO}$.
 Colourless.

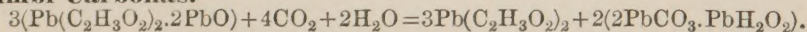
From a solution of this Basic Acetate is obtained—

Plumbi Carbonas (*White Lead*), $2\text{PbCO}_3 \cdot \text{PbH}_2\text{O}_2$, by passing Carbonic Anhydride.†

Lead Acetate is left in the solution.
 Heavy white powder.

* Litharge may be used instead of Lead.

† In the "Dutch Process," preferred for making white lead to be used as a pigment, coils of metallic lead are placed in open jars containing weak vinegar, and the jars

Plumbi Carbonas.

From Plumbi Nitras is prepared—

Plumbi Iodidum, PbI_2 , by mixing its solution with one of Iodide of Potassium.

Precipitate of Iodide collected.
Washed and dried at a gentle heat.
Yellow powder.

PROPERTIES.

Plumbi Acetas is **soluble** in $2\frac{1}{2}$ parts of water, also in Rectified Spirit. Plumbi Iodidum is **soluble** in solutions of the Alkaline Iodides, or of Caustic Potash, in Acetic Acid, and slightly in Alcohol.

The Oxide and Carbonate are insoluble.

Plumbi Acetas, in dry air, **effloresces**, and is superficially decomposed by Carbonic Anhydride.

In solution the Acetate is only partially decomposed by Carbonic Acid, the Acetic Acid liberated protecting the remainder.

When **heated**,

Plumbi Acetas is first dehydrated and then decomposed.
Plumbi Iodidum is decomposed.

Solution of Lead Acetate has an acid **reaction**, of the Basic Acetate an alkaline one.

Lead Acetate and Basic Acetate form insoluble compounds with albumen. The latter forms an opaque jelly with mucilage.

Plumbi Nitras is used only to prepare the Iodide.

OFFICINAL PREPARATIONS.

Liquor Plumbi Subacetatis. See above.

Liquor Plumbi Subacetatis Dilutum. The same, diluted to $\frac{1}{80}$ th the strength, with a little Rectified Spirit added. $\frac{1}{5}$ th gr. in the drachm.

embedded in spent tan. The tan, putrifying, becomes heated, the acetic acid rises in vapour, the lead becomes oxidised by the air, and the oxide unites with the acetic vapour to form *basic acetate*. Finally, the carbonic anhydride from the putrifying tan precipitates a compact layer of *Carbonate* on the surface of the lead, leaving plumbic acetate free to unite with oxide to form fresh *basic acetate*.

Glycerinum Plumbi Subacetatis. Made by boiling 5 oz. of Lead Acetate and $3\frac{1}{2}$ oz. of Litharge with a pint of Glycerine and 12 oz. of water, filtering, and evaporating off the water.

Pil Plumbi cum Opio. Lead Acetate and Opium, with Confection of Roses. 3 gr. of the salt, $\frac{1}{2}$ gr. of the Opium, in 4 gr.

Unguentum Plumbi Acetatis. 1 in $37\frac{1}{2}$.

Unguentum Plumbi Carbonatis. 1 in 8.

Unguentum Plumbi Iodidi. 1 in 8.

Unguentum Glycerini Plumbi Subacetatis. 1 in 6.

Emplastrum Plumbi. Lead Soap, made by boiling Litharge with Olive Oil and water.

Pale yellow.

Emplastrum Plumbi Iodidi. Iodide of Lead, with Lead and Rosin plasters 1 in 9.

Pale orange.

Suppositoria Plumbi Co. 3 gr. of Lead Acetate and 1 gr. of Opium in each.

BISMUTH COMPOUNDS. 7 *Officinal.*

Bismuthum.—B.
Purificatum.—*Bismuthous*
Nitrate. { **B. Subnitras.** { **B. Oxidum.**
{ **B. Citras.—B. et Ammonii**
[**Citras.**

Bismuthum is commercial Bismuth.

Freed from impurities by being fused with Potassium Cyanide and Sulphur, and subsequently with 5 p.c. of mixed Carbonates of Potassium and Sodium, previously dried, it forms **Bismuthum Purificatum**.

From Bismuthum Purificatum is prepared, by dissolving in diluted Nitric Acid and heating, a solution of *Bismuthous Nitrate*, $\text{Bi}(\text{NO}_3)_3$; **and on pouring this solution—**

1. into cold water, a precipitate of **Bismuthi Subnitras** (*Magistery of Bismuth*).

Basic Bismuthous Nitrate, $\text{BiO} \cdot \text{NO}_3 \cdot \text{H}_2\text{O}$. An acid salt is left in the solution.

Washed, dried at 150° F.

White powder, minute scales.

- 2.** into a solution of Ammonii Carbonas (p. 125), a precipitate of **Bismuthi Carbonas.**

Basic Bismuthous Carbonate. $((\text{BiO})_2\text{CO}_3)_2\text{H}_2\text{O}$.

Washed, dried at 150° F.

White powder.

From Bismuthi Subnitras are prepared—

- 1. Bismuthi Oxidum, Bi_2O_3 ,** by boiling with Liquor Sodæ.

The residue washed, and dried at 212° F.

Lemon yellow powder.

- 2. Bismuthi Citras**, $\text{BiC}_6\text{H}_5\text{O}_7$, by dissolving in Nitric Acid, diluting as long as a clear fluid is the result, and adding a solution of freshly made Sodium Citrate.

The Citrate is precipitated. Boiled, cooled, washed, dried at 212° F.

White powder.

From Bismuthi Citras is prepared—

Liquor Bismuthi et Ammonii Citratis, by dissolving in Liquor Ammoniaë, and diluting to a stated degree.

Colourless.

Bismuthi et Ammonii Citras, by evaporating the above to a syrupy consistence, spreading on glass or porcelain, and drying at 100° F.

Translucent scales.

PROPERTIES.

B. et Amm. Citras is freely **soluble** in water.

The other compounds are **insoluble** in water or alcohol.

They are blackened in air containing Sulphuretted Hydrogen.

The weight of **Bism. Subnitras** must be remembered in prescribing. It contains about $\frac{2}{3}$ by weight of Bismuth, the “**Carbonas**” only about $\frac{1}{3}$.

OFFICIAL PREPARATIONS.

Liquor Bismuthi et Ammonii Citratis. See above.

Trochisci Bismuthi. 2 gr. of **Bism. Subnitras** in each.

Sodium Chloride is formed, Carbonic Anhydride is given off, and Antimonious Oxide remains.
Greyish white powder.

From Antimonii Oxidum is prepared—

Antimonium Tartaratum (*Tartar Emetic*), Potass-Antimonious Tartrate, $(K(SbO)C_4H_4O_6)_2H_2O$, by digesting with Cream of Tartar (p. 117) for 24 hours, dissolving the product in water, filtering, and crystallizing out.

Rhombic octahedra.

PROPERTIES.

Tartar Emetic is **soluble** in 15 parts of water, insoluble in Rectified Spirit.

Antimonious Chloride is soluble in a small quantity of water, but is precipitated as an oxychloride on dilution.

It is soluble in Hydrochloric Acid.

The Oxide and Sulphide are **insoluble** in water or spirit.

The Oxide is *fusible*.

The Sulphide, heated in air, gives Sulphurous Anhydride and Antimonious Oxide.

Tartar Emetic is dehydrated at $212^\circ F.$; heated strongly it is decomposed.

Liq. Antim. Chloridi has a similar action on organic tissues to that of Zinci Chloridum (p. 140).

OFFICINAL PREPARATIONS.

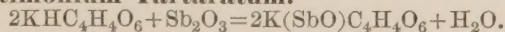
Pulvis Antimonialis. Antimonii Oxidum, with twice its weight of Calcii Phosphas.

Liquor Antimonii Chloridi. See above.

Vinum Antimoniale. Tartar Emetic in sherry, $\frac{1}{4}$ gr. in the drachm.
Brown.

Unguentum Antimonii Tartarati. 1 in 5.

Antimonium Tartaratum.



The compound (SbO) here plays the part of a monad. Sb_2O_3 may be considered as $(SbO)_2O$.

ARSENICAL COMPOUNDS. 7 *Officinal* (2 reckoned elsewhere).

Acidum Arseniosum.	...	<i>Potassium Arsenite</i> (Liquor Arsenicalis).
		<i>Arsenious Chloride</i> (Liq. Arsenii Hydrochloricus).
		Arsenii Iodidum .— Ars. et Hydrarg. Iodidum .
		Sodii Arsenias .— Ferri Arsenias .

Potassium Arsenite and Arsenious Chloride are officinal only as Liq. Arsenicalis and Liq. Arsenii Hydrochloricus.

Acidum Arseniosum (*Arsenious Anhydride*), As_2O_3 , is obtained by roasting arsenical ores, and purified by sublimation.

Stratified masses, or heavy white powder.

From Acidum Arseniosum are prepared—

1. **Liquor Arsenicalis**, a weak solution of Potassium Arsenite, by dissolving in hot water with an equal weight of Potassium Carbonate, diluting to a stated strength, and flavouring with Tinct. Lavandulæ Co.

Pink.

One p.c. of Acid. Arseniosum.

2. **Liquor Arsenii Hydrochloricus**, a solution of Arsenious Chloride, AsCl_3 , by boiling in water with Hydrochloric Acid, and diluting to a stated strength.

Colourless.

Same strength as Liq. Arsenicalis.

3. **Arsenii Iodidum** (*Arsenious Iodide*), AsI_3 , by dissolving in water with Hydriodic Acid, and evaporating to dryness.

Small orange crystals.

4. **Sodii Arsenias** (see p. 121).

5. **Ferri Arsenias** (see p. 130).

From Arsenii Iodidum is prepared—

Liquor Arsenii et Hydrargyri Iodidi (*Donovan's Solution*), by dissolving with equal parts of Red Iodide of Mercury (p. 134) in water, and diluting until each fluid ounce contains $4\frac{1}{2}$ gr. of either iodide.

A double iodide is formed, which is soluble.

Pale yellow liquid.

PROPERTIES.

Arsenii Iodidum is readily **soluble** in water and Rectified Spirit.

Acidum Arseniosum is **soluble** in 100 parts of cold water, in 20 parts of boiling water.

It is freely soluble in glycerine.

It sublimes at 400° F.

Nitric Acid, and Iodine in presence of water, oxidize it to Arsenic Acid
($\text{As}_2\text{O}_3 + \text{I}_4 + 5\text{H}_2\text{O} = 4\text{HI} + 2\text{H}_3\text{AsO}_4$).

Its solutions preserve organic matters from putrefaction.

OFFICIAL PREPARATIONS.

Liquor Arsenicalis.

Liquor Arsenii Hydrochloricus.

Liquor Ars. et Hydr. Iodidi.

Liquor Sodii Arseniatis. See p. 124.

} See above.

MAGNESIUM COMPOUNDS. 6 *Officinal*.

SEA WATER.	}	Magnesii	{	M. Carbonas Ponderosa.	{	Magnesia Ponderosa.
ALUM-ORE.				Sulphas.		Magnesii Citras.
DOLOMITE.				M. Carbonas Levis . .		Magnesia Levis.

The Citrate is officinal only in solution.

Magnesii Sulphas (*Epsom Salts*), $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$, is obtained in crystals by evaporating the mother liquor of sea-water, after separation of the Sodium Chloride, or the mother liquor of the Alum manufacture (p. 154).

Or,—by treating Dolomite (*Magnesian Limestone*, a compound of Magnesium and Calcium Carbonates) with Sulphuric Acid, dissolving out the Magnesium Sulphate thus formed in water, and separating it from the small amount of Calcium Sulphate that is dissolved with it by crystallizing out.

Minute rhombic prisms.

From Magnesii Sulphas are prepared—

- 1. Magnesii Carbonas Ponderosa**, by mixing a strong solution with a strong solution of Sodium Carbonate and evaporating to dryness.

Washed, dried at 212°F .
White granular powder.

- 2. Magnesii Carbonas Levis**, by mixing weak solutions of the same and boiling for fifteen minutes.

Washed, dried at 212°F .
White powder, very light.
Partly crystalline, partly amorphous.

The composition of both forms of Carbonate is the same, viz., $3\text{MgCO}_3 \cdot \text{MgO} \cdot 5\text{H}_2\text{O}$.

Magnesia Ponderosa and **Magnesia Levis**, both MgO , are obtained by calcining Magn. Carbonas Ponderosa and Magn. Carbonas Levis respectively.

From either form of Carbonate is prepared—

Liquor Magnesii Citratis, by dissolving in a solution of Citric Acid in excess, thus forming Magnesium Citrate, pouring the solution into a bottle, adding Syrup of Lemons, nearly filling up with water, inserting Potassium Bicarbonate, and immediately corking and tying down.

Colourless. Effervesces on being opened.

PROPERTIES.

Magnesii Sulphas is **soluble** in equal parts of water, insoluble in Rectified Spirit; precipitated by Rectified Spirit from strong aqueous solutions.

The Carbonate and Oxide are **insoluble** in water or spirit. The former is soluble in solutions of Carbonic Acid.

Magnesii Sulphas is **efflorescent**.

By heat—

Magnesii Sulphas is first dehydrated, undergoing aqueous fusion; then fused.

The Carbonate is reduced to Magnesia (see above).

OFFICINAL PREPARATIONS.

Liquor Magnesii Carbonatis (*Fluid Magnesia*). Freshly precipitated Carbonate dissolved in water impregnated with Carbonic Acid under pressure; 10 gr. to the fl. oz.

To be kept corked.

Liquor Magnesii Citratis. See above.

Enema Magnesii Sulphatis. An ounce of Epsom Salts in 15 fl. oz. of starch mucilage, with 1 fl. oz. of olive oil.

Mistura Sennæ Co. See p. 29.

ALUM.

Alumen, Ammonium (or Potassium) Aluminium Sulphate, K or $\text{NH}_4\text{Al}(\text{SO}_4)_2 \cdot 12\text{H}_2\text{O}$, is obtained from Alum-ore, which contains Iron Pyrites (Ferric Sulphide), FeS_2 , and *Alumina*, Al_2O_3 .

On roasting the ore, or exposing it to the air, the Pyrites yields Ferrous Sulphide, FeS , and *Sulphuric Anhydride*, SO_3 . The latter forms, with the Alumina,—*Aluminic Sulphate*, $\text{Al}_2(\text{SO}_4)_3$; the former is oxidized to form Ferrous Sulphate.

On lixiviating, the two Sulphates dissolve out. On evaporating the solution, the Ferrous salt separates in crystals. On mixing the mother liquor, containing Aluminic Sulphate, with a concentrated solution of Ammonium or Potassium Sulphate, **Alumen** crystallizes out.

Re-dissolved and re-crystallized. Octahedra.

Alumen Exsiccatum (*dehydrated Alum*), K or $\text{NH}_4\text{Al}(\text{SO}_4)_2$, is obtained by heating Alum till all its water of crystallization is driven off.

White powder.

PROPERTIES.

Alumen is **soluble** in 18 parts of cold water, in less than its own weight of boiling water. It is insoluble in Rectified or even in Proof Spirit.

Its solutions have a strongly acid reaction, and dissolve zinc or iron with evolution of hydrogen.

Alumen Exsiccatum is **insoluble**, but on being moistened, it resumes its water of crystallization slowly, with evolution of heat.

Alumen **effloresces** slowly in air.

It undergoes "*aqueous fusion*" when heated. Strongly heated, it loses its acid.

Alum forms insoluble compounds with albumen, fibrin, casein, and gelatin.

Alumen Exsiccatum is used as an **escharotic** owing to this property, and also to its capacity for abstracting water.

OFFICIAL PREPARATION.

Glycerinum Aluminis. 1 part in $5\frac{1}{2}$.

LITHIUM COMPOUNDS. 2 *Officinal.*

The chief sources of Lithium compounds are the minerals termed Lepidolite, Triphane, and Petalite, and certain mineral springs.

Lithii Carbonas, Li_2CO_3 , is obtained by adding a solution of Ammonii Carbonas to one of Lithium Sulphate or Chloride, and collecting the precipitate.

Washed, dried.
White powder.

Lithii Citras, $\text{Li}_3\text{C}_6\text{H}_5\text{O}_7 \cdot 4\text{H}_2\text{O}$, is prepared by dissolving the Carbonate in a solution of Citric Acid, and crystallizing out.

Small white crystals.
Deliquescent.

PROPERTIES.

Lithii Citras is **soluble** in 2 parts of water; Lithii Carbonas in 100 parts; more readily in solutions of Carbonic Acid.

Lithii Citras is very **deliquescent**.

OFFICIAL PREPARATION.

Liquor Lithiæ Effervescens (*Lithia water*). 10 gr. of Lithii Carbonas in a pint of water, saturated with Carbonic Acid under a pressure of 4 atmospheres.

To be kept corked.

SILVER COMPOUNDS. 4 *Officinal.*

Argentum Purificatum is pure refined metallic Silver.

Argenti Nitras (*Lunar Caustic*), AgNO_3 , is obtained by dissolving Silver in diluted Nitric Acid by the aid of heat, and either crystallizing out, or evaporating to dryness, fusing, and running into moulds.

Rhombic tabular prisms, or
Moulded sticks.

Argenti Oxidum is obtained by pouring a solution of the Nitrate into Liquor Calcis.

The Oxide, Ag_2O , is precipitated.

Washed : dried at 212°F .
Olive brown powder.

Argenti et Potassii Nitras (*Mitigated Caustic*), is made by fusing one part of Arg. Nitras with two of Pot. Nitras, and running into moulds.

Moulded sticks.

PROPERTIES.

Argenti Nitras is **soluble** in half its weight of water, in 15 parts of Rectified Spirit.

Argenti Oxidum is very slightly soluble in water, readily soluble in Liq. Ammonia.

Argenti Nitras blackens when **exposed to light**, or when placed in contact with organic matter. Its solutions blacken under similar circumstances. It is reduced to metallic Silver in presence of Copper or Phosphorus.

Argenti Oxidum is liable to **explode** in contact with Creasote.

By heat, both are reduced to metallic Silver, the Nitrate fusing before reduction.

Argenti Nitras forms insoluble compounds with albumen and albuminoid substances. These compounds, at first white, blacken if exposed to light.

COPPER COMPOUNDS.

Cuprum is fine Copper Wire.

Cupri Nitras, $\text{Cu}(\text{NO}_3)_2 \cdot 3\text{H}_2\text{O}$, is obtained by dissolving Copper in diluted Nitric Acid, and crystallizing out at a temperature not lower than 70°F .

Deep blue prisms.

Very deliquescent.

At a temperature below 70°F , the nitrate crystallizes in tables possessing the composition $\text{Cu}(\text{NO}_3)_2 \cdot 6\text{H}_2\text{O}$.

Cupri Sulphas, $\text{CuSO}_4 \cdot 5\text{H}_2\text{O}$, is obtained by roasting Copper to form the black Oxide, CuO , dissolving in hot diluted Sulphuric Acid, filtering, and crystallizing out.

Oblique prisms, bright blue.

Soluble in 4 parts of water, insoluble in pure alcohol, slightly in Rectified Spirit.

Dehydrated by heat.

With albumen and albuminoids, its action is similar to that of Arg. Nitras.

CERIUM.

Cerii Oxalas, $\text{Ce}_2\text{C}_2\text{O}_4 \cdot 3\text{H}_2\text{O}$, is obtained as a precipitate by adding a solution of Ammonium Oxalate to one of any soluble salt of Cerium.

Washed: dried at 212° . White Powder.

Insoluble in water or alcohol.

Dehydrated by heat.

MANGANESE.

Manganesii Oxidum Nigrum, Native Black Oxide of Manganese, MnO_2 , is introduced into the Pharmacopœia for the purpose of evolving Chlorine from Hydrochloric Acid (p. 92).

Heavy black powder.

SYNOPSIS

OF THE

COMPOUND PREPARATIONS OF THE PHARMACOPŒIA,
AND THEIR INGREDIENTS.

POWDERS.

Hydrargyrum cum Cretâ.

Mercury	1
Chalk	2
	3

Pulv. Amygdalæ Co.

Sweet Almonds	8
Gum	1
Sugar	4
	13

Pulv. Antimonialis.

Oxide of Antimony	1
Calcium Phosphate	2
	3

Pulv. Catechu Co.

Catechu	4
Kino	2
Rhatany	2
Cinnamon	1
Nutmeg	1
	10

Pulv. Cinnamomi Co.

Cinnamon	1
Cardamoms	1
Ginger	1
	3

Pulv. Cretæ Aromaticus.

Cinnamon	4
Nutmeg	3
Saffron	3
Cloves	1½
Cardamoms	1
Sugar	25
Chalk	11
	48½

Pulv. Cr. Ar. c. Opio.

P. Cretæ Aromat.	39
Opium	1
	40

Pulv. Elaterini Co.

Elaterin	1
Sugar of Milk	39
	40

Pulv. Glycyrrhizæ Co.

Liquorice Root	2
Senna	2
Fennel	1
Sulphur	1
Sugar	6
	12

Pulv. Ipecacuanhæ Co. (Dover's Powder).

Ipecacuanha	..	..	1
Opium	..	..	1
Potassium Sulphate	..	..	8
			10

Pulv. Jalapæ Co.

Jalap	..	..	5
Cream of Tartar	..	..	9
Ginger	..	..	1
			15

Pulv. Kino Co.

Kino	..	..	15
Opium	..	..	1
Cinnamon	..	..	4
			20

Pulv. Opii Co.

Opium	..	..	3
Pepper	..	..	4
Ginger	..	..	10
Caraway	..	..	12
Tragacanth..	..	..	1
			30

Pulv. Rhei Co. (Gregory's Powder).

Rhubarb	..	..	2
Light Magnesia	..	..	6
Ginger	..	..	1
			9

Pulv. Scammonii Co.

Scammony	..	..	4
Jalap	..	..	3
Ginger	..	..	1
			8

Pulv. Tragacanthæ Co.

Tragacanth..	..	..	1
Gum	..	..	1
Starch	..	..	1
Sugar	..	..	3
			6

CONFECTIONS.

Conf. Opii.

Pulv. Opii Co.	..	..	1
Syrup	..	(by weight)	3
			4

Conf. Piperis.

Black Pepper	..	..	2
Caraway	..	..	..
Honey	..	..	15
			20

Conf. Scammonii.

Scammony Resin	..	..	2
Ginger	..	..	1
Oil of Caraway	..	..	$\frac{1}{2}$
Oil of Cloves	..	..	$\frac{1}{2}$
Syrup	..	..	2
Honey	..	..	1
			6 $\frac{1}{8}$

Conf. Sennæ.

Senna	..	..	2 $\frac{1}{3}$
Coriander	..	..	1
Figs..	..	..	4
Tamarinds	..	..	3
Cassia	..	..	3
Prunes	..	..	2
Liquorice (Extract)	..	..	$\frac{1}{3}$
Sugar	..	..	10

After manufacture :—25

Conf. Sulphuris.

Sulphur	4
Cream of Tartar	1
Syrup of Orange-peel	4
Tragacanth.. ..	$\frac{1}{24}$
	—
	9

Conf. Terebinthinæ.

Oil of Turpentine	1
Liquorice Root	1
Honey	2
	—
	4

The Confections of Roses and of Hips (Conf. Rosæ Gallicæ, Conf. Rosæ Caninæ) contain no ingredient besides the drug and the sugar.

PILL-MASSSES.*a. Aloetic. 9.***Pil. Aloës Barbadosis.**

Barbadoes Aloes	2
Soap*	1
Oil of Caraway	$\frac{1}{8}$
Confection of Roses	1
	—
	$4\frac{1}{8}$

Pil. Aloës et Ferri.

Barbadoes Aloes	2
Sulphate of Iron	$1\frac{1}{2}$
Pulv. Cinn. Co.	3
Confection of Roses	4
	—
	$10\frac{1}{2}$

Pil. Cambogiæ Co.

Gamboge	1
Barbadoes Aloes	1
Pulv. Cinn. Co.	1
Soap*	2
Syrup	q.s.
	—
	6

Pil. Colocynthis Co.

Colocynth	1
Barbadoes Aloes	2
Scammony	2
Potassium Sulphate	$\frac{1}{4}$
Oil of Cloves	$\frac{1}{4}$
	—
	$5\frac{1}{2}$

Pil. Col. et Hyoseyami.

Pil. Colocynth. Co.	2
Extract of Henbane	1
	—
	3

Pil. Aloës Socotrinæ.

Socotrine Aloes	2
Soap*	1
Oil of Nutmeg	$\frac{1}{8}$
Confection of Roses	1
	—
	4

Pil. Aloës et Asafœtidadæ.

Socotrine Aloes	1
Asafœtida	1
Soap*	1
Confection of Roses	1
	—
	4

Pil. Aloës et Myrrhæ.

Socotrine Aloes	2
Myrrh	1
Saffron	$\frac{1}{2}$
Treacle	1
Glycerine	q.s.
	—
	5

Pil. Rhei Co.

Rhubarb	3
Socotrine Aloes	$2\frac{1}{4}$
Myrrh	$1\frac{1}{2}$
Soap*	$1\frac{1}{2}$
Oil of Peppermint.. ..	$\frac{1}{6}$
Glycerine	1
Treacle	3
	—
	$12\frac{1}{4}$

* Unless otherwise stated, "Soap" here signifies *Castile Soap* (*Sapo Durus*).

*β. Opiate. 3.***Pil. Saponis Co.**

Opium	1
Soap*	4
Glycerine	q.s.
	5

Pil. Plumbi c. Opio.

Acetate of Lead	6
Opium	1
Confection of Roses	1
	8

Pil. Ipecac. c. Scilla.

Dover's Powder (p. 159) ..	3
Squill	1
Ammoniac	1
Treacle	q.s.
	7

*γ. Squill.***Pil. Scillæ Co.**

Squill	1½
Ammoniac	1
Ginger	1
Soap*	1
Treacle	2
	6½

*δ. Resinous. 2.***Pil. Asafoetidae Co.**

Asafoetida	2
Galbanum	2
Myrrh	2
Treacle	1
	7

Pil. Scammonii Co.

Scammony Resin	1
Jalap Resin	1
Curd Soap	1
Tr. Zingib. Fort.	1
Rectified Spirit	2

After manufacture :—3½

*ε. Conium.***Pil. Conii Co.**

Extract of Hemlock	5
Ipecacuanha	1
Treacle	q.s.
	7

*ζ. Mercurial. 2.***Pil. Hydrargyri (Blue Pill).**

Mercury	2
Liquorice Root	1
Confection of Roses	3
	6

Pil. Hydrarg. Subchloridi Co.
(Plummer's Pill).

Calomel	1
Sulphd. Antimony	1
Guaiaac Resin	2
Castor Oil	1
	5

*η. Martial. 2.***Pil. Ferri Carbonatis.**

Saccharated Carbonate of	
Iron	4
Confection of Roses	1
	5

* Unless otherwise stated, "Soap" here signifies *Castile Soap (Sapo Durus)*.

Pil. Ferri Iodidi.

Iron	..	..	..	4
Iodine	..	..	..	8
Sugar	..	..	..	7
Liquorice	..	..	..	14
Water	..	..	..	5

—
After manufacture:—30

*A.***Pil. Phosphori.**

Phosphorus	..	..	..	1
Tolu	..	..	..	40
Beeswax	..	..	..	19
Curd Soap	..	..	..	30
				—
				90

MIXTURES.*a. Emulsions and Suspensions.***Mist. Amygdalæ.**

Pulv. Amygd. Co. (p. 158)	1
Water	 8

Mist. Ammoniaci.

Ammoniac	..	..	..	1
Water	..	..	..	32

Mist. Scammonii.

Scammony	..	..	..	3 gr.
Milk	..	..	..	1 oz.

Mist. Gualiaci.

Guaiac Resin	..	..	..	2
Sugar	..	..	..	2
Gum	..	..	..	1
Cinnamon Water	..	..	..	80

**** Ammoniacum**, being a gum-resin, emulsifies with water alone. The simple resins require the aid of an emulsifying agent (pp. 49, 54).

Mist. Cretæ.

Prepared Chalk	..	..	..	1
Gum	..	..	..	1
Syrup	..	..	..	2
Cinnamon Water	..	..	..	30

Mist. Ferri Co. (Griffith's Mixture).

Ferri Sulphas	..	2½ gr.
Potassii Carbonas	..	3 gr.
Myrrh	..	6 gr.
Sugar	..	6 gr.
Spirit of Nutmeg	..	24 min.
Rose Water, to	..	1 oz.

Result:—Ferrous Carbonate and Myrrh, suspended by the aid of a "resin-soap" formed by the Myrrh and Potash.

Mist. Spiritus Vini Gallici (Egg Flip.)

Egg Yolks	..	Two.
Sugar	..	½ oz.
Brandy	..	4 oz.
Cinnamon Water	..	4 oz.

*β. Solutions. 4.***Mist. Creasoti.**

Creasote	..	1 min.
Glacial Acetic Acid	..	1 min.
Spirit of Juniper	..	2 min.
Syrup	..	32 min.
Water	..	1 oz.

Mist. Sennæ Co.

Epsom Salts	..	96 gr.
Liq. Extract of		
Liquorice	..	24 min.
Tr. Cardam. Co.	..	36 min.
Tincture of Senna	..	1 drm.
Infusion of Senna, to		1 oz.

Mist. Ferri Aromatica.

Red Bark.
Calumba.
Cloves.
Iron Wire.

An infusion of the above in Peppermint Water, with

Tincture of Orange-peel.
Tr. Cardam. Co.

Contains a minute proportion of organic salts of Iron.

DECOCTIONS.

Extr. Colocynthis Co.

A spirituous extract of

Colocynth	..	..	6
to which is added			
Extract of Socotrine Aloes			12
Scammony Resin	..		4
Soap	..	..	3
Cardamoms	..	..	1

After manufacture:—24

INFUSIONS.

Infus. Gentianæ Co.

Gentian.
Orange-peel.
Lemon-peel.

Infus. Aurantii Co.

Orange-peel.
Lemon-peel.
Cloves.

Infus. Rosæ Acidum.

Red Rose Petals ..	11 gr.
Ac. Sulphuricum Dil.	6 min.
Water	1 oz.

Infus. Cinchonæ Acidum.

Red Bark	..	22 gr.
Ac. Sulph. Arom.		6 min.
Water	.. ..	1 oz.

Decoct, Aloës Co.

Extract of Socotrine Aloes.
Extract of Liquorice.
Myrrh.
Saffron.
Potassium Carbonate.
Tr. Cardam. Co.

Decoct. Sarsæ Co.

Sarsaparilla.
Sassafras.
Guaiac Wood.
Mezereon.
Liquorice.

TINCTURES.

Tr. Cardamomi Co.

Cardamoms.
Caraway.
Raisins.
Cinnamon.
Cochineal.

Tr. Chloroformi Co.

Chloroform..	..	..	1
Rectified Spirit	..	..	4
Tr. Cardam. Co.	..	..	5

Tr. Lavandulæ Co.

Red Sandal Wood.
Cinnamon.
Nutmeg.
Oil of Lavender.
Oil of Rosemary (a trace).

FLAVOURED PREPARATIONS.

Besides the above —

Infus. Catechu is flavoured with Cinnamon.

Infus. Lini „ **Liquorice.**

Infus. Sennæ	„	Ginger.
--------------	---	---------

Decoct. Hæmatoxyl .. Cinnamon.

Tr. Cinchonæ Co.

Red Bark.
Orange-peel.
Serpentary.
Saffron.
Cochineal.

Tr. Gentianæ Co.

Gentian.
Orange-peel.
Cardamoms.

Tr. Chloroformi et Morphinae.

Chloroform $1\frac{1}{4}$ min.
Ether $\frac{1}{3}$ min.
Rectified Spirit .. $1\frac{1}{4}$ min.
Hydrochlor. of Mor-
phine $\frac{1}{48}$ gr.
Ac. Hydrocy. D. .. $\frac{5}{8}$ min.
Oil of Peppermint .. $\frac{1}{80}$ min.
Liq. Ext. Liquorice .. $1\frac{1}{4}$ min.
Treacle }
Syrup }
in 10 min.

Tr. Benzoini Co. (Friar's Balsam).

Benzoin 44 gr.
Storax 33 gr.
Socotrine Aloes .. 8 gr.
Tolu 11 gr.
in the ounce.

Tr. Camphoræ Co. (Paregoric).

Camphor $1\frac{1}{2}$ gr.
Opium 2 gr.
Benzoic Acid.. .. 2 gr.
Oil of Anise 2 min.
in the ounce.

Tr. Opii Ammoniata (Scotch Paregoric).

Opium 5 gr.
Saffron 9 gr.
Benzoic Acid .. 9 gr.
Oil of Anise .. 3 min.
Liq. Ammon. Fort. 96 min.
in the ounce.

*For the Ammoniated Tinctures
of Guaiac, Valerian, and
Quinine, see page 6.*

SPIRITS.

Sp. Armoraciæ Co.

Horse-radish.
Orange-peel.
Nutmeg.

Sp. Ammoniaæ Fœtidus.

Asafoetida.
Liq. Ammon. Fort.

Sp. Amm. Aromaticus (Sal Volatile).

Amm. Carbonas.
Liq. Amm. Fort.
Oil of Nutmeg.
Oil of Lemon.

*** In each case the ingredients
are distilled with spirit.

Sp. Ætheris Co. (Hoffmann's Anodyne.)

See p. 100.

Tr. Catechu is flavoured with Cinnamon.

Tr. Aloes Liquorice.

Tr. Quininae Orange-peel; being made with Tr. Aurantii.

Tr. Sennæ Raisins, Coriander, and Caraway.

Tr. Rhei Coriander and Cardamoms, and coloured with Saffron.

Tr. Iodi contains Iodide of Potassium.

Tr. Ferri Acetatis } contains free acid.
Tr. Ferri Perchloridi }

Tr. Kino contains glycerine.

LOZENGES.

Troch. Bismuthi.

Bismuthi Subnitras	2 gr.
Magnesii Carbonas	2 $\frac{2}{3}$ gr.
Calcii Carbonas Præcipitata	3 $\frac{1}{2}$ gr.
Rose Water	.. q.s.

in each lozenge.

Troch. Morphinae et Ipecacuanhæ.

Morphinae Hydrochloras	$\frac{1}{36}$ gr.
Ipecacuanha	.. $\frac{1}{12}$ gr.
Tr. Tolutana	.. a trace

in each lozenge.

DILUTE ACID.

Ac. Sulphuricum Aromaticum.

Sulphuric Acid	..	..	1 $\frac{1}{2}$
Tr. Zingib. Fort.	..	..	1
Sp. Cinnam.	..	..	1
Sp. Rect.	..	..	18
			—
			20

SOLUTION.

Liquor Calcis Saccharatus.

Slaked Lime	..	7 gr.
Sugar	..	48 gr.
		in the ounce.

Vin. Opii is flavoured with Cinnamon and Cloves.

Vin. Aloes „ Cardamoms and Ginger.

Vin. Rhei „ Canella Alba.

Vin. Quininae and **Vin. Ferri Citratis**, with orange-peel, being made with Orange wine. The former contains free citric acid.

Syr. Rhei } is flavoured with Coriander.

Syr. Sennæ } „

Syr. Limonis „ Lemon-peel.

Syr. Ferri Phosphatis contains free Phosphoric Acid; **Syr. Scillæ** free Acetic Acid.

Troch. Opii are flavoured with Liquorice and Tolu.

Troch. Morphinae „ } Tolu.

Troch. Ac. Tannici „ }

Liquor Arsenicalis is coloured with Tr. Lavandulæ Co.

Liquor Magnesii Citratis is flavoured with Syrup of Lemons.

Liquor Arsenici Hydrochloricus

Liquor Ferri Perchloridi (and **L. F. P. Fort**)

Liquor Ferri Acetatis (and **L. F. A. Fort**)

Liquor Ferri Pernitratis

Liquor Hydrargyri Nitratis Acidus

Liquor Morphinae Acetatis

Liquor Morphinae Hydrochloratis

Liquor Strychninae Hydrochloratis

} contain free acid.

Liquor Hydrarg. Perchloridi contains Chloride of Ammonium

Liquor Iodi „ Iodide of Potassium.

Liquor Atropinae Sulphatis is made with Camphor Water.

Liquor Epispasticus „ Acetic Ether.

Liquor Gutta Percha „ Chloroform.

Liquor Sodii Ethylatis „ Alcohol.

SUPPOSITORIES.

Suppositoria Plumbi Co.

Opium	1 gr.
Acetate of Lead	3 gr.
in each suppository.	

*** Suppos. Hydrargyri are made with Ung. Hydrargyi.

LINIMENTS.

a. Strong Tinctures, made with Rectified Spirit, for painting on the skin. 4.

To 1 fl. oz. of Rectified Spirit.

Lin. Aconiti.

Aconite Root ..	$\frac{2}{3}$ oz.
Camphor	14 gr.

Lin. Belladonnæ.

Belladonna Root ..	} do.
Camphor	

Lin. Iodi.

Iodine	55 gr.
Iodide of Potassium ..	22 gr.
Camphor	11 gr.

Lin. Camphoræ Co.

Camphor ..	55 gr.
Liq. Amm. Fort.	2 drms.
Oil of Lavender	13 min.

β. Oily or Saponaceous Mixtures for rubbing into the skin. 12.

Lin. Ammoniaæ.

Liq. Ammoniaæ	1
Olive Oil	3

An Ammonia Soap is formed, which emulsifies the rest of the oil.

Lin. Calcis (Carron Oil).

Liquor Calcis.	} equal parts.
Olive Oil.	

A similar reaction.

Lin. Camphoræ.

Camphor	1
Olive Oil	4
Solution takes place.	

Lin. Crotonis.

Croton Oil	2
Oil of Cajeput	7
Rectified Spirit	7

Lin. Terebinthinæ.

Soft Soap	2
Camphor	1
Water	2
Oil of Turpentine	16

Lin. Saponis (Opodeldoc).

Soap	44 gr.
Camphor	22 gr.
Oil of Rosemary	9 min.
Water	$\frac{1}{4}$ oz.
Rectified Spirit, to	1 oz.

Lin. Pot. Iodidi cum Sapone.

Iodide of Potassium	66 gr.
Curd Soap	88 gr.
Glycerine	48 min.
Oil of Lemon	6 min.
Water, to	1 oz.

Lin. Sinapis Co.

Oil of Mustard	12 min.
Ethereal Extract of Mezereon	8 gr.
Camphor	24 gr.
Castor Oil	1 drms.
Rectified Spirit, to	1 oz.

Lin. Chloroformi.

Chloroform	} equal parts.
Camphor Liniment	

Lin. Hydrargyri.

Ung. Hydrargyri (p. 167)	} equal parts.
Liquor Ammoniaæ	
Camphor Liniment	

Lin. Terebinth. Aceticum.

Oil of Turpentine ..	..	4
Glacial Acetic Acid ..	..	1
Camphor Liniment ..	..	4

Lin. Opii.

Laudanum	} equal parts.
Soap Liniment	

OINTMENTS.

*α.***Adeps Benzoatus.** See p. 15.**Unguentum Simplex.**

White Wax ..	..	2
Lard ..	..	3
Almond Oil ..	..	3

*β. Made on a basis of Benzoated Lard. 15.***Ung. Aconitinæ.****Ung. Atropinæ.****Ung. Belladonnæ.**

Made with the "Alcoholic Extract."

Ung. Calaminæ.**Ung. Chrysarobini.****Ung. Gallæ.****Ung. Gallæ cum Opio.****Ung. Hydrargyri Subchloridi.****Ung. Iodoformi.****Ung. Plumbi Acetatis.****Ung. Potassii Iodidi.**

Contains a little Pot. Carbonas.

Ung. Sabinæ.

Contains beeswax.

Ung. Staphisagriæ.**Ung. Sulphuris.****Ung. Zinci.**

Oxide of Zinc.

*γ. On a basis of Simple Ointment. 8.***Ung. Creasoti.****Ung. Elemi.****Ung. Resinæ.**

Contains Beeswax and Almond Oil.

Ung. Antimonii Tartarati.**Ung. Hydrarg. Iodidi Rubri.****Ung. Hydrarg. Ammoniati.****Ung. Plumbi Iodidi.****Ung. Plumbi Carbonatis.***δ. On a basis of Beeswax. 1.***Ung. Picis Liquidæ.***ε. On a basis of Beeswax and Olive Oil. 2.***Ung. Cantharidis.****Ung. Hydrargyri Co. (Scott's Dressing).**

Made with Ung. Hydrargyri and Camphor.

*ζ. On a basis of Beeswax and Lard. 1.***Ung. Terebinthinæ.**

Contains Rosin.

*η. On a basis of Suet and Lard. 1.***Ung. Hydrargyri (Blue Ointment).***θ. On a basis of Lard and Olive Oil. 1.***Ung. Hydrargyri Nitratis (Citrine Ointment).**

Contains some free Nitric Acid.

ι. *On a basis of Lard and Glycerine.* 1.

Ung. Iodi.

Contains as much Iodide of Potassium as Iodine.

κ. *On a basis of White Wax and Almond Oil.* 2.

Ung. Cetacei.

Contains Benzoin.

Ung. Plumbi Subacetatis Co.

Contains Camphor.

λ. *On a basis of Vaseline.* 2.

Ung. Hydrarg. Nitrat. Dil.

Ung. Zinci Oleati.

μ. *On a basis of Vaseline and Paraffin.* 9.

Ung. Acidi Borici.

Ung. Acidi Carbolici.

Ung. Acidi Salicylici.

Ung. Eucalypti.

Ung. Glycerini Plumbi Subacetatis.

Ung. Hydrargyri Oxidi Rubri
(*Golden Ointment*).

Ung. Potassæ Sulphuratæ.

Ung. Sulphuris Iodidi.

Ung. Veratrinæ.

Contains Olive Oil.

PLASTERS.

α.

Empl. Plumbi (*Diachylon*).

Lead Soap, *i.e.*, Oleate and Margarate of Lead (see p. 145).

Empl. Saponis Fuscum.

Acetate of Lead.

Soap.

Beeswax.

Olive Oil.

Empl. Ammoniaci c. Hydrargyro.

Ammoniac.

Mercury.

Olive Oil.

Sulphur.

Empl. Picis.

Burgundy Pitch.

Frankincense.

Rosin.

Beeswax.

Nutmeg Butter.

Olive Oil.

Empl. Cantharidis (*Blister*).

Cantharides.

Rosin.

Beeswax.

Suet.

Lard.

β. *Made on a basis of lead plaster.*

Empl. Ferri.

With Peroxide of Iron.

Burgundy Pitch.

Empl. Hydrargyri.

With Mercury.

Olive Oil.

Sulphur.

Empl. Galbani.

With Galbanum.

Ammoniac.

Beeswax.

Empl. Plumbi Iodidi.

With Iodide of Lead.

Rosin.

Empl. Saponis. }**Empl. Resinæ. }***With Soap and Rosin.*

The former with six times as much Soap as Rosin; the latter with only half as much.

γ. *On a Basis of Rosin Plaster.*

Empl. Opii.*With powdered Opium. 1 in 10.*

δ. *On a basis of Soap and Rosin Plasters. 2*

Empl. Belladonnæ.*With the "Alcoholic Extract."***Empl. Calefaciens.***With Cantharides.*

Rosin.

Beeswax.

Nutmeg Butter.

PAPERS.

Charta Sinapis.

Black Mustard Seeds in powder.

Gutta Percha.

Charta Epispastica.

Cantharides.

Canada Balsam.

Rosin.

Spermaceti.

White Wax.

Olive Oil.

MISCELLANEOUS.

Lotio Hydrargyri Flava (*Yellow Wash*). (See p. 134.)

Lotio Hydrargyri Nigra (*Black Wash*). (See p. 134.)

Collodium Flexile.

Canada Balsam.

Castor Oil.

Collodion.

Collodium Vesicans.

Collodion, 5 p.c.

Liq. Epispasticus.

POPULAR DESIGNATIONS OF CERTAIN PHARMACOPŒIAL
PREPARATIONS AND COMPOUNDS.

Absolute Alcohol	..	..	of	Alcohol Ethylicum.
Aromatic Confection	..	..	,,	Pulv. Cretæ Aromaticus.
Black Wash	..	..	,,	Lotio Hydrargyri Nigra.
Blue Pill,—Ointment	..	..	,,	Pil.,—Ung. Hydrargyri.
Bonjean's Ergotine	..	..	,,	Ergotinum.
Calomel	..	..	,,	Hydrargyri Subchloridum.
Carron Oil	..	..	,,	Linim. Calcis.
Chinese Camphor	..	..	,,	Menthol.
Chloric Ether	..	..	,,	Sp. Chloroformi.
Citrine Ointment	..	..	,,	Ung. Hydrargyri Nitratis.
Corrosive Sublimate	..	..	,,	Hydrargyri Perchloridum.
Cream of Tartar	..	..	,,	Potassii Tartras Acida.
Croton Chloral	..	..	,,	Butyl-Chloral Hydras.
Diachylon	..	..	,,	Emplastrum Plumbi.
Donovan's Solution	..	..	,,	Liq. Arsenii et Hydrargyri Iodidi.
Dover's Powder	..	..	,,	Pulv. Ipecac. Co.
Epsom Salts	..	..	,,	Magnesii Sulphas.
Flowers of Sulphur	..	..	,,	Sulphur Sublimatum.
Fowler's Solution	..	..	,,	Liq. Arsenicalis.
Friar's Balsam	..	..	,,	Tr. Benzoini Co.
Glauber's Salt..	..	..	,,	Sodii Sulphas.
Golden Ointment	..	..	,,	Ung. Hydrarg. Oxidi Rubri.
Granular Effervescent Citrate of				
Magnesia	..	..	,,	Sodii Citro-Tartras Effervescens.
Goa Powder	..	..	,,	Chrysarobinum.
Goulard Water	..	..	,,	Liq. Plumbi Subacetatis Dil.
Goulard's Extract	..	..	,,	Liq. Plumbi Subacetatis.
Gregory's Powder	..	..	,,	Pulv. Rhei Co.
Grey Powder	..	..	,,	Hydrargyrum cum Cretâ.
Griffith's Mixture	..	..	,,	Mist. Ferri Co.

Gypsum	..	..	..	of	Calcii Sulphas.
Hartshorn	..	..	..	,,	Ammonia.
Hoffmann's Anodyne	..	..	..	,,	Sp. Ætheris Co.
Laudanum	..	..	..	,,	Tr. Opii.
Lenitive Electuary	..	..	..	,,	Confect. Sennæ.
Litharge	..	..	..	,,	Plumbi Oxidum.
Liver of Sulphur	..	..	..	,,	Potassa Sulphurata.
Lunar Caustic	..	..	..	,,	Argenti Nitras.
Milk of Sulphur	..	..	..	,,	Sulphur Præcipitatum.
Mindererus Spirit	..	..	..	,,	Liq. Ammonii Acetatis.
Nitre; Saltpetre	..	..	..	,,	Potassii Nitras.
Oil of Male Fern	..	..	..	,,	Extr. Filicis Liquidum.
Oil of Vitriol	..	..	..	,,	Acidum Sulphuricum.
Opodeldoc	..	..	..	,,	Lin. Saponis.
Paregoric Elixir	..	..	..	,,	Tr. Camphoræ Co.
Plummer's Pill	..	..	..	,,	Pil. Hydrarg. Subchloridi Co.
Prussic Acid	..	..	..	,,	Ac. Hydrocyanicum.
Rochelle Salt	..	..	..	,,	Soda Tartarata.
Sal Ammoniac	..	..	..	,,	Ammonii Chloridum.
Sal Volatile	..	..	..	,,	Sp. Ammoniæ Aromaticus.
Scotch Paregoric	..	..	..	,,	Tr. Opii Ammoniata.
Scott's Ointment	..	..	..	,,	Ung. Hydrargyri Co.
Sugar of Lead	..	..	..	,,	Plumbi Acetas.
Sweet Spirits of Nitre..	..	..	..	,,	Sp. Ætheris Nitrosi
Tartar Emetic	..	..	..	,,	Antimonium Tartaratum.
Vaseline	..	..	..	,,	Paraffinum Molle.
Vitriol: Blue, Green, White..	..	..	..	,,	Cupri,—Ferri,—Zinci Sulphas.
White Arsenic	..	..	..	,,	Acidum Arseniosum.
White Precipitate	..	..	..	,,	Hydrargyrum Ammoniatum.
Yellow Wash	..	..	..	,,	Lotio Hydrargyri Flava.

Substitutes for Patent Remedies are introduced in Pulvis Antimonialis, for "James's Fever Powders;" in Confectio Piperis, for "Ward's Paste;" and in Tr. Chloroformi et Morphinae, for "Chlorodyne."

LATIN PHRASES EMPLOYED IN PRESCRIBING.

The following are among those in most frequent use.

R, recipe.	M, misce	.. take.	Mix.
Aa, ana, singulorum (—arum)	..	.. of each.	
Partes æquales.. ..	..	.. equal parts.	
Q. s., quantum sufficiat	..	.. a sufficiency.	
F., fiat haustus statim sumendus	..	.. make a draught to be taken at once.	
Cujus (quorum, quarum, equibus) sum-			
a(n)tur, capia(n)tur	.. ..	.. of which let there be taken.	
Cochleare, C. modicum, amplum	..	.. a tea-, dessert-, table-spoon.	
Tertiâ quâque horâ, nocte	.. ..	.. every third hour, night.	
Omni, quoque die. Alternis diebus..	..	.. every day. Every other day.	
Quotidie. Semel, bis, ter, quater die.	daily. Once, twice, thrice, four times	daily.	
Cras mane. Mane primo. Vespere..	to-morrow morn. The first thing in	the morning. In the evening.	
Sequenti nocte. Horâ somni	..	.. the following night. At bed-time.	
Post horas sex, si opus sit	.. ..	.. six hours after, if necessary.	
P. r. n., pro re natâ	.. ..	.. as circumstances arise.	
Alvo adstrictâ. Tusse molestâ	..	.. when (if) the bowels be confined, the	cough be troublesome.
Donec alvus dejiciat	.. ..	.. until the bowels act.	
Repetatur. Sæpe utendus	.. ..	.. repeat. To be used frequently.	
Ejusdem mitte	.. ..	.. send of the same.	
Dimidium. Ss., Semis	.. ..	.. a half. Half.	
Semihora. Uncia cum semisse	..	.. half an hour. An ounce and a half.	
Quadrans. Tertia, quinta pars	..	.. a quarter. A third, fifth part.	
Divide in partes duodecim	.. ..	.. divide into twelve parts.	
Deaurentur pilulæ	.. ..	.. gild the pills.	
Aqua fervens, calida, tepida, frigida..	boiling, hot, warm, cold water.		
Applicetur lotio; —ntur hirudines			
undecim	.. ..	.. apply the lotion, eleven leeches.	
Partibus affectis. Lateri dolenti	..	.. to the affected parts, the painful side.	
Femori, brachio interno, externo	..	.. to the inner, outer side of the thigh,	arm.
Tempori dextro, sinistro	.. ..	.. to the right, left temple.	
Regioni hepatis, cordis	.. ..	.. to the region of the liver, heart.	
Injiciatur sub cute	.. ..	.. inject subcutaneously.	
Modo præscripto	.. ..	.. as directed.	
Signa	.. ..	.. label as follows.	

SYNOPSIS OF THE DOSES OF THE PHARMACOPŒIAL
DRUGS AND PREPARATIONS.

The *Maximum* doses given in this Synopsis are in all cases those of the Pharmacopœia. The *Minimum* doses are in a few cases modified.

α. OF THE DRUGS.

[illegible]

Acids.

Arsenious	..	..	..	..	..	.. ¹ / ₆₀	to	.. ¹ / ₁₂	gr.
Carbolic	..	..	..	..	..	..	1	to	3 gr.
Gallic and Tannic	..	..	..	..	..	..	2	to	10 gr.
Benzoic	..	..	..	..	..	..	10	to	15 gr.
Citric, Tartaric, Boric, and Salicylic	..	..	..	..	..	..	10	to	30 gr.
Liquefied Carbolic	..	..	..	..	..	..	1	to	4 min.
Concentrated Phosphoric	..	..	..	..	..	..	2	to	5 min.
Dilute Hydrocyanic	..	..	..	..	..	..	2	to	8 min.
Dilute Nitrohydrochloric	..	..	..	..	..	..	5	to	20 min.
Dilute Sulphuric, Nitric, Hydrochloric, Phosphoric, and Aromatic Sulphuric	..	..	..	..	..	..	5	to	30 min.
Dilute Hydrobromic	..	..	..	..	..	..	15	to	50 min.
Sulphurous	..	..	..	..	..	..	¹ / ₂	to	1 drachm.
Lactic Acid and Oxymel	..	..	..	..	..	..	¹ / ₂	to	2 drachms
Dilute Acetic and Vinegar	..	..	..	..	..	..	a dr.	to	an oz.

(METALS AND METALLIC COMPOUNDS.)

Silver, Copper, Lead, and Cerium Compounds.

Nitrate of Silver	$\frac{1}{6}$ to $\frac{1}{3}$ gr.
Sulphate of Copper	$\frac{1}{4}$ to 2 gr.
Oxide of Silver	$\frac{1}{2}$ to 2 gr.
Oxalate of Cerium	1 to 2 gr.
Acetate of Lead	1 to 4 gr.
Sulphate of Copper as an emetic	5-10 gr.

Arsenical Compounds.

Iodide of Arsenic	$\frac{1}{30}$ gr.
Arsenious Acid	$\frac{1}{60}$ to $\frac{1}{12}$ gr.
Sodium Arseniate	$\frac{1}{16}$ to $\frac{1}{8}$ gr.
Iron Arseniate	$\frac{1}{16}$ to $\frac{1}{2}$ gr.

Antimonial Compounds.

Tartar Emetic <i>as a diaphoretic</i>	$\frac{1}{16}$ to $\frac{1}{6}$ gr.
Tartar Emetic <i>as an emetic</i>	1 to 2 grs.
Oxide	1 to 4 grs.
Sulphuretted Antimony	1 to 5 grs.

Mercury and its Compounds.

Red Iodide	$\frac{1}{16}$ to $\frac{1}{8}$ gr.
Corrosive Sublimate	$\frac{1}{16}$ to $\frac{1}{4}$ gr.
Calomel	1 to 5 grs.
Hydrarg. cum Cretâ	3 to 8 grs.

Zinc Compounds.

Acetate	$\frac{1}{4}$ to 2 grs.
Sulphate and Valerianate	1 to 3 grs.
Oxide	2 to 10 grs.

As emetics—

Acetate	10 to 20 grs.
Sulphate	10 to 30 grs.

Magnesium Compounds.

Magnesia and the Carbonate (heavy or light) ..	10 grs. to a drachm.
Epsom Salts (<i>purgative</i>)	1 to 4 drachms.

Iron and its Compounds.

Arseniate	$\frac{1}{16}$ to $\frac{1}{4}$ gr.
Dehydrated Sulphate	$\frac{1}{2}$ to 3 gr.
Sulphate, and Reduced Iron	1 to 5 gr.
Phosphate, Citrates, and Tartrated Iron	5 to 10 gr.
Carbonate and Peroxide	5 to 30 gr.

Calcium Compounds.

Sulphuretted Lime	$\frac{1}{10}$ to 1 gr.
Chloride	3 to 10 gr.
Hypophosphite	5 to 10 gr.
Phosphate	10 to 20 gr.
Chalk, and Precipitated Carbonate	10 to 60 gr.

Bismuth Compounds.

Citrates	2 to 5 gr.
Oxide	5 to 15 gr.
Carbonate and Subnitrate	5 to 20 gr.

Alum	10 to 20 gr.
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Ammonium Compounds 5 to 20 gr.

<i>Except the Carbonate</i>	3 to 10 gr.
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Lithium Compounds.

Carbonate	3 to 6 gr.
Citrate	5 to 10 gr.

Potassium Compounds.

Permanganate	1 to 5 gr.
Iodide	2 to 20 gr.
Bromide, Chloride, Nitrate, and Carbonate	10 to 30 gr.
Bicarbonate	10 to 40 gr.
Sulphate, Citrate, Acetate, Acid Tartrate	15 to 60
Tartrate (<i>purgative</i>)	1 to 4 drachms.

Sodium Compounds.

Arseniate..	..	..	..	..	..	..	$\frac{1}{16}$ to $\frac{1}{8}$ gr.
Valerianate	..	..	..	..	..	..	1 to 5 grs.
Iodide and Dehydrated Carbonate	..	..	..	..	..	..	3 to 10 grs.
Hypophosphite	..	..	..	..	..	..	5 to 10 grs.
Sulphocarbolate ..	..	..	..	..	..	..	5 to 15 grs.
Sulphite ..	..	..	..	..	..	..	5 to 20 grs.
Bromide and Salicylate ..	..	..	..	..	..	..	10 to 30 grs.
Borax ..	..	..	..	..	..	..	10 to 40 grs.
Bicarbonate	..	..	..	..	..	..	10 to 60 grs.
Citro-tartrate	..	..	..	..	..	..	1 to 2 drachms.
Tartrated Soda (<i>purgative</i>)	..	..	..	..	..	..	2 to 4 drachms.
Sulphate and Phosphate (<i>purgative</i>)	..	..	..	..	..	..	2 to 8 drachms (1 oz.)

(ANIMAL DRUGS.)

Pepsin ..	..	..	..	..	..	..	2 to 5 gr.
Oxgall and Musk	..	..	..	..	..	..	5 to 10 gr.
Spermaceti ..	..	..	..	..	..	..	1 scr. to 1 drachm.
Cod-Liver Oil ..	..	..	..	..	..	..	1 drachm to 1 oz.

(VEGETABLE DRUGS.)

Digitalis	..	..	..	..	..	..	$\frac{1}{2}$ to $1\frac{1}{2}$ gr.
Ipecacuanha	..	..	..	..	..	..	$\frac{1}{2}$ to 2 gr.
Squill ..	..	..	..	..	..	..	1 to 3 gr.
Calabar Bean	..	..	..	..	..	..	1 to 4 gr.
Lupulin	..	..	..	..	..	..	2 to 5 gr.
Conium leaf, Colocynth, and Colchicum	..	..	..	..	..	..	2 to 8 gr.
Savin ..	..	..	..	..	..	..	4 to 10 gr.
Rhubarb, Calumba, Quassia	..	..	..	..	..	..	5 to 20 gr.
Jalap and Valerian	..	..	..	..	..	..	10 to 30 gr.
Ipecacuanha as an emetic	..	..	..	..	..	..	15 to 30 gr.
Ergot ..	..	..	..	..	..	..	20 to 30 gr.
Jaborandi	..	..	..	..	..	..	5 to 60 gr.
Santonica	..	..	..	..	..	..	10 to 60 gr.
Coca, Cubebs, and Wurrus	..	..	..	..	..	..	$\frac{1}{2}$ to 2 drachms.
Cusso ..	..	..	..	..	..	..	2 to 4 drachms.
Yeast ..	..	..	..	..	..	..	$\frac{1}{2}$ to 1 oz.

Resins, Gum-resins, Oleo-resins, Balsams, Gums.

Podophyllin	..	..	..	..	..	..	$\frac{1}{4}$ to 1 gr.
Gamboge ..	..	..	..	..	..	..	1 to 4 gr.
Jalap-resin	..	.	..	..	..	..	2 to 5 gr.
Scammony-resin	..	..	..	..	..	..	3 to 8 gr.
Scammony	..	..	..	..	..	..	5 to 10 gr.
Asafoetida	..	..	..	..	..	..	5 to 20 gr.
Tolu and Ammoniac	..	..	..	..	..	..	10 to 20 gr.
Guaiac-resin	..	..	..	..	..	..	10 to 30 gr.
Balsam of Peru ..	..	..	..	..	..	..	10 to 15 min.
Oleo-resin of Cubebs	..	..	..	..	..	..	5 to 30 min.
Copaiva ..	..	..	..	..	..	..	30 to 60 min.

Concrete Juices, etc.

Elaterium and Chrysarobin	..	..	..	..	..	$\frac{1}{16}$ to $\frac{1}{2}$ gr.
Opium ..	..	..	..	..	..	$\frac{1}{2}$ to 3 gr.
Aloes ..	..	..	..	..	..	2 to 6 gr.
Camphor ..	..	..	..	..	..	1 to 10 gr.
Catechu and Kino	..	..	..	..	..	10 to 30 gr.
Manna ..	..	..	..	..	..	.. 1 drachm to 1 oz.

Fixed Oils.

Croton Oil	..	..	..	..	..	$\frac{1}{3}$ to 1 min.
Cod-liver and Castor Oils	..	..	..	..	..	A drachm to an oz.

Volatile Oils **1 to 4 min.**

Except—

The Oils of Copaiba and Cubebs	..	..	..	5 to 20 min.
Oil of Sandal-wood	..	..	..	10 to 30 min.
Oil of Turpentine	..	..	..	10 min. to 4 drachms.

Active Principles.

Atropine and its Sulphate	..	..	..	..	$\frac{1}{60}$ to $\frac{1}{30}$ gr.
Elaterine ..	..	..	..	..	$\frac{1}{40}$ to $\frac{1}{10}$ gr.
Strychnine ..	..	..	..	..	$\frac{1}{30}$ to $\frac{1}{12}$ gr.
Morphine Salts ..	..	..	..	..	$\frac{1}{8}$ to $\frac{1}{12}$ gr.
Hydrochlorate of Cocaine	..	..	..	..	$\frac{1}{5}$ to 1 gr.
Podophyllin ..	..	..	..	..	$\frac{1}{4}$ to 1 gr.
Codeine ..	..	..	..	..	$\frac{1}{4}$ to 2 gr.
Aloin, Menthol and Thymol	..	..	..	..	$\frac{1}{2}$ to 2 gr.
Santonin ..	..	..	..	..	2 to 6 gr.
Caffeine ..	..	..	..	..	1 to 5 gr.
Salts of Quinine, Cinchonine, Cinchonidine, Caffeine and Beberine	..	..	..	..	1 to 10 gr.
Salicin ..	..	..	..	..	3 to 20 gr.

β. OF THE OFFICIAL PREPARATIONS.**Extracts.**

Of Calabar Bean and Belladonna <i>root</i> *	..	..	$\frac{1}{16}$ to $\frac{1}{4}$ gr.
Of Stramonium ..	..	..	$\frac{1}{4}$ to $\frac{1}{2}$ gr.
Of Cannab. Ind., Aconite, Belladonna <i>leaves</i> †	..	..	$\frac{1}{4}$ to 1 gr.
Of Colchicum, Nux Vom., Gelsemium, and Opium ..	..	..	$\frac{1}{2}$ to 2 gr.
Of Quassia and Poppy, and <i>Ergotin</i> ..	..	..	2 to 5 gr.
Of Hemlock and Aloes ..	..	..	2 to 6 gr.
Of Cascara Sagrada ..	..	..	2 to 8 gr.
Of Gentian, Colocynth, Chamomile, Calumba, and Jaborandi ..	..	..	2 to 10 gr.
Of Henbane ..	..	..	5 to 10 gr.
Of Rhubarb, Lettuce, Jalap, and Hop ..	..	..	5 to 15 gr.
Of Krameria ..	..	..	5 to 20 gr.
Of Pareira, Taraxacum, and Logwood ..	..	..	5 to 30 gr.
Of Rhamnus Frangula and Liquorice ..	..	..	10 to 60 gr.

* Extractum Belladonnæ Alcoholicum.

† Extractum Belladonnæ.

Liquid Extracts.

Of Cinchona	..	..	..	..	..	..	5 to 10 min.
Of Cimicifuga	..	..	..	..	..	..	3 to 30 min.
Of Fern and Ergot	..	..	..	..	..	..	10 to 30 min.
Of Opium	..	..	..	..	..	..	10 to 40 min.
Of Liquorice, Bael, Pareira, Taraxacum, Coca, Cascara							
Sagrada	..	..	..	..	..	..	$\frac{1}{2}$ to 2 drachms.
Of Sarsaparilla and Rhamnus Frangula	..	..	..	..	..	..	1 to 4 drachms.

Juices.

Of Belladonna	..	..	..	..	..	..	5 to 15 min.
Of Hemlock and Henbane	..	..	..	..	..	..	$\frac{1}{2}$ to 1 drachm.
Of Scoparium and Taraxacum	..	..	..	..	..	..	1 to 2 drachms.

Essences of Anise and Peppermint	..	..	..	..	..	10 to 20 min.
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Infusions, Decoctions, Mixtures, and Waters, 1 to 2 oz.

With the following exceptions—

Infusions.

Of Digitalis	..	..	..	..	..	1 drm. to $\frac{1}{2}$ oz.
Of Chamomile, Matico, Bucco, and Cloves	..	..	..	..	..	1 to 4 oz.
Of Cusso	..	..	..	..	..	4 to 8 oz.
Of Linseed	..	..	..	..	..	ad libitum.

Decoctions.

Of Barley, Broom, Taraxacum, Pomegranate, and Iceland Moss	..	..	..	..	..	2 to 4 oz.
Of Sarsaparilla (both simple and compound)	..	..	..	..	..	2 to 10 oz.

Mixtures.

Of Ammoniac	..	..	..	..	..	$\frac{1}{2}$ to 1 oz.
Of Senna	..	..	..	..	..	1 to $1\frac{1}{2}$ oz.

Water.

Of Cherry-laurel	..	..	..	..	..	5 to 30 min. N 2
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Tinctures $\frac{1}{2}$ to 2 drachms.

With the following exceptions: namely—

Tr. Chloroformi et Morphinæ		5 to 10 min.
Tr. of Aconite	.. .. .	5 to 15 min.
Trs. of Belladonna, Iodine, Nux Vomica, Cantharides,	}	5 to 20 min.
Capsicum, Cannabis Indica, Gelsemium,		
Hellebore, and Ginger (strong tincture)		
Tr. of Opium	.. .. .	5 to 40 min.

Trs. of Digitalis, Ergot, Colchicum, Iron-salts,	}	10 to 30 min.
Stramony, Sumbul, Squill, Lobelia, Larch		
Trs. of Hemlock, Podophyllin, Savin, Cimicifuga,	}	15 to 60 min.
Chloroform, Camph. Co., and Ginger		

Tr. of Tolu	.. .. .	20 to 40 min.
Trs. of Henbane, Benzoin, Myrrh, Asafoetida, Arnica,	}	30 to 60 min.
Jaborandi, and the Ammoniated Tinctures		
of Opium, Guaiac, and Valerian	..	

Tr. of Senna	.. .. .	1 to 4 drachms.
Tr. of Rhubarb (as a purgative)	.. .. .	4 to 8 drachms.

Wines.

Of Colchicum	.. .. .	5 to 30 min.
Of Opium and Ipecacuanha	.. .. .	5 to 40 min.
Of Antimony	.. .. .	5 to 60 min.

Of Rhubarb and Aloes	.. .. .	1 to 2 drachms.
Of Iron and its Citrate	.. .. .	1 to 4 drachms.

Of Ipecac. as an emetic	.. .. .	3 to 6 drachms.
Of Quinine	.. .. .	4 to 8 drachms.

Spirits $\frac{1}{2}$ to 1 drachm.

With the following exceptions, viz.—

Of Camphor 10 to 30 min.

Of Chloroform 20 to 60 min.

Of Ether.. .. . 30 to 90 min.

Of Horseradish and Nitrous Ether, and Sp. *Ætheris* Co. $\frac{1}{2}$ to 2 drachms.

Syrups 1 drachm.

With the following exceptions, viz.—

Of Squill and Iodide of Iron $\frac{1}{2}$ to 1 drachm.

Of Chloral $\frac{1}{2}$ to 2 drachms.

Of Rhubarb and Senna 1 to 4 drachms.

Vinegar of Squill 15 to 40 min.

Oxymel of Squill $\frac{1}{2}$ to 1 drachm.

Solutions (Liquors).

Liq. *Atropinæ Sulphatis* 1 to 4 min.

Liq. *Arsenicalis* and Liq. *Arsenii Hydrochloricus* .. 2 to 8 min.

Liq. *Strychninæ* and Liq. *Sodii Arseniatis* 5 to 10 min.

Liq. *Chlori* and Liq. *Sodæ Chlorinata*.. .. . 10 to 20 min.

Liq. *Ferri Perchloridi, Acetatis, Pernitratis*; and Donovan's Solution 10 to 30 min.

Liq. *Morphinæ Bimeconatis* 5 to 40 min.

Liq. *Morphinæ Hydrochloratis* and *Acetatis*, Liq. *Potassæ*, Liq. *Calcis Saccharatus* and Liq. *Calcii Chloridi* 10 to 60 min.

Liq. *Bismuthi et Ammonii Citratis* 30 to 60 min.

Liq. *Hydrarg. Perchloridi* 30 to 120 min.

Liq. *Potassii Permanganatis* 2 to 4 drachms.

Solutions of *Ammonium salts* 2 to 6 drachms.

Liq. *Magnesii Carbonatis* 1 to 2 oz.

Liq. *Calcis* 1 to 4 oz.

Liq. *Magnesii Citratis* and the Effervescent Solutions 5 to 10 oz.

Hypodermic Injections.

Of Morphine	1 to 5 min.
Of Apomorphine.. .. .	2 to 8 min.
Of Ergotine	3 to 10 min.

Oleum Phosphoratum	5 to 10 min.
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Powders.

Pulv. Elaterini Co.	$\frac{1}{2}$ to 5 gr.
Pulv. Opii Co.	2 to 5 gr.

Pulv. Antimonialis	3 to 5 gr.
Hydrargyrum cum Cretâ	3 to 8 gr.
Pulv. Cinnamomi Co.	3 to 10 gr.

Pulv. Ipecacuanhæ Co.	5 to 15 gr.
Pulv. Kino Co.	5 to 20 gr.

Pulv. Scammonii Co.	10 to 20 gr.
Pulv. Cretæ Aromaticus c. Opio	10 to 40 gr.
Pulv. Cretæ Aromaticus	10 to 60 gr.

Pulv. Catechu Co.	1 to 2 scr.
Comp. Powders of Jalap, Rhubarb, Liquorice, and } A scr. to a drachm.	
Tragacanth	

Confections	1 to 2 drachms.
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With the following exceptions, viz.—

Of Opium	5 to 20 gr.
Of Scammony	10 to 30 gr.

Pills	5 to 10 gr.
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With the following exceptions—

Pil. Saponis Co. and Pil. Pb. c. Opio	3 to 5 gr.
Pil. Phosphori	2 to 4 gr.
Pil. Hydrargyri and Pil. Ferri Iodidi	3 to 8 gr.

Pil. Scammonii Co.	5 to 15 gr.
Pil. Ferri Carbonatis	5 to 20 gr.

Tablets of Nitroglycerine **one or two.**

Lozenges **one to six.**

Except—

Troch. Ipëcacuanhæ one to three.

PROPORTION OF DOSE TO AGE.

The following scale (Gaubius') is of general acceptance :—

One-twelfth.	One-eighth.	One-sixth.	One-fourth.	One-third.	One-half.	Two-thirds.	Full dose.
Yrs. 1	2	3	4	7	14	21	

Beyond 65 yrs., diminish in the inverse gradation of the above—

Children tolerate almost adult doses of *Mercury*, but only the most minute quantities of *Opium*.

In injecting subcutaneously, commence with half the dose which would be given by the mouth.

PROPORTION OF ACTIVE INGREDIENTS IN THE PHARMACOPŒIAL PREPARATIONS.*

Dilute Acids.

See page 9.

Solutions.

Amount of active ingredient in one drachm.

Liq. Calcis ; Liq. Hydrarg. Perchloridi	..	..	..	$\frac{1}{16}$	gr.
Liq. Pb. Subacet. Dil.	..	..	..	$\frac{1}{6}$	gr.
Liq. Potassii Permanganatis ;† Arsenical solutions and solu- tions of Alkaloids	..	..	..	<i>rather more than</i>	$\frac{1}{2}$ gr.
Liq. Morphinæ Bimeconatis	..	..	..	$\frac{3}{4}$	gr.
Liq. Calcis Saccharatus	..	..	..	1	gr.
Liq. Ferri Acetatis	..	..	..	$1\frac{3}{4}$	gr.
Liq. Sodæ..	..	..	..	$2\frac{1}{3}$	gr.
Liq. Iodi..	..	..	..	$2\frac{1}{2}$	gr.
Liq. Potassæ	..	..	..	$3\frac{1}{2}$	gr.
Liq. Bism. et Amp. Citratis	..	(of Citrate of Bismuth)		5	gr.
Liq. Ferri Acetatis Fortior	..	..	..	7	gr.
Liq. Ferri Perchloridi and Liq. Calcii Chloridi	..	..		8	gr.
Liq. Sodii Ethylatis	..	..	..	$10\frac{1}{2}$	gr.
Liq. Plumbi Subacetatis	..	..	..	$13\frac{1}{4}$	gr.
Liq. Epispasticus	..	..	(of Cantharides)	14	gr.
Liq. Acidi Chromici	..	..	..	16	gr.
Liq. F. Perchlor. Fortior	..	..	..	32	gr.
Liq. Zinci Chloridi‡	..	..	..	36	gr.

* For the proportion of Opium in its preparations, see also p. 60.

† "Condy's Fluid" contains 1 gr. of the Permanganate in the drachm.

‡ "Burnett's Solution" is a concentrated solution of Zinc Chloride, of sp. gr. 2.0.

In one ounce—

Liq. Magnesii Carbonatis 10 gr.

Liq. Chlorig contains $\frac{1}{3}$ gr. of Chlorine in the drachm.

Liq. Ammoniae „ $5\frac{1}{2}$ „ Ammonia

Liq. Amm. Fortior contains nearly 16 gr. of Ammonia in the drachm.

Liq. Calcis Chlorinatae is made with 5 gr. to the drachm.

Oleum Phosphoratum contains $\frac{1}{11}$ gr. of Phosphorus in 10 min.

Syrupus contains 6 oz. of sugar in 7 fl. oz.

Syrups.

Amount of the active drug contained in, or corresponding to, one drachm.

Syr. Ferri Phosphatis	..	..	..	..	..	..	1 gr.
Syr. Tolutanus	..	..	..	..	..	..	2 gr.
Syr. Scillae	..	..	..	..	..	..	3 gr.
Syr. Rhei..	..	..	..	..	..	..	4 gr.
Syr. Ferri Iodidi..	..	..	..	..	..	..	$4\frac{1}{2}$ gr.
Syr. Chloral	..	..	..	..	..	..	10 gr.
Syr. Papaveris	..	..	..	..	..	..	25 gr.
Syr. Sennae	..	..	..	..	..	..	27 gr.

Wines.

Ditto.

Vin. Quininae	..	..	..	..	..	..	$\frac{1}{8}$ gr.
Vin. Antimoniale	..	..	..	(of Tartar Emetic)	..	..	$\frac{1}{4}$ gr.
Vin. Ferri Citratis	..	..	..	(of F. et Amm. Citr.)	..	..	1 gr.
Vin. Aloes	..	..	..	..	..	..	2 gr.
Vin. Ipecacuanhae	..	..	..	..	..	..	$2\frac{3}{4}$ gr.
Vin. Rhei..	..	..	..	..	..	..	4 gr.
Vin. Opii ..	..	..	..	..	(of Opium)	..	$5\frac{1}{2}$ gr.
Vin. Colchici	..	..	..	..	..	..	11 gr.

Tinctures.

Ditto.

Tr. Nucis Vomicae	..	..	..	(of the Extract)	..	..	$\frac{7}{8}$ gr.*
Tr. Quininae ; Q. Ammoniata† ; Podophylli	..	..	..	(of the Resin)	..	..	1 gr.
Tr. Iodi ..	..	..	..	..	..	..	$1\frac{1}{3}$ gr.

* Containing $\frac{1}{8}$ th gr. of alkaloids.

† Tr. Quininae is made with the Hydrochlorate, and is therefore about $\frac{1}{6}$ th stronger in alkaloid than Tr. Quin. Amm., which is made with the Sulphate.

Tr. Cannabis Indicæ	..	..	..	(of the Extract)	2 $\frac{3}{4}$ gr.
Tr. Ferri Acetatis	..	..	..	.. ..	1 $\frac{3}{4}$ gr.
Tr. Ferri Perchloridi	..	..	..	.. ..	8 gr.
Tr. Chloroformi Co.	..	..	..	(of Chloroform)	6 min.
Tr. Lavandulæ Co.	..	..	..	(of Ol. Lavandulæ)	$\frac{1}{4}$ min.
Tr. Opii Ammoniata	..	..	..	(of Opium)	$\frac{1}{2}$ gr.
Tr. Cantharidis ; Cardam. Co.	..	..	..	.. ..	$\frac{2}{3}$ gr.
Tr. Aloes ..	..	..	..	.. ..	1 $\frac{1}{3}$ gr.
Tr. Capsici ; Quassia	..	..	..	.. ..	2 gr.
Tr. Arnicæ ; Belladonnæ ; Croci	..	..	..	.. ..	2 $\frac{3}{4}$ gr.
Tr. Opii ; Gentianæ Co.	..	..	..	.. ..	4 gr.
Tr. Aurantii ; Benzoini Co. ; Cinchonæ Co. ; Kino ; Rhei	..	..	..	.. ..	5 $\frac{1}{2}$ gr.
Tr. Cinchonæ ; Guaiaci ; Pyrethri ; Veratri Viridis	..	..	..	.. ..	11 gr.
Tr. Ergotæ ; Jaborandi	..	..	..	.. ..	14 gr.
Tr. Zingiberis Fortior	..	..	..	.. ..	27 gr.
Tr. Camphoræ Co.	..	{ of Opium and of Benzoic Acid of Camphor			$\frac{1}{4}$ gr. $\frac{1}{6}$ gr.
In all other cases	..	..	..	.. ..	7 gr.

Vinegars.*Ditto.*

Acet. Cantharidis	..	..	..	.. ..	5 $\frac{1}{4}$ gr.
Acet. Scillæ	..	..	..	.. ..	7 gr.

Spirits.*See p. 7.***Glycerines.***See p. 8.***Oleates.***See p. 9.***Essences.***See p. 5.*

Waters.*Amount of active ingredient in 1 fluid ounce.*

Aq. Camphoræ ..	..	..	..	..	..	..	$\frac{1}{2}$ gr.
Aq. Chloroformi ..	..	..	..	..	..	..	$2\frac{1}{2}$ min.

*See also p. 8.***Infusions and Decoctions.***Amount of the active drug to which 1 fluid ounce corresponds.*

Inf. Digitalis ..	..	..	..	..	..	..	$2\frac{3}{4}$ gr.
Inf. Gentianæ; Quassiæ ..	..	..	..	..	..	..	$5\frac{1}{2}$ gr.
Inf. Aurantii Co.; Chiratæ; Caryophylli; Ergotæ; Rhei; Rosæ Acidum*; Serpentariæ; Valerianæ ..	..	..	..	..	..	..	11 gr.
Inf. Catechu; Lini ..	..	..	..	..	..	..	15 gr.
Inf. Cusso ..	..	..	..	..	..	..	27 gr.
Inf. Cascarillæ; Sennæ ..	..	..	..	..	..	..	44 gr.

Dec. Aloës Co. ..	..	..	..	..	..	..	$4\frac{1}{2}$ gr.
Dec. Cinchonæ; Hæmatoxyli; Pareiræ; Quercus ..	..	..	..	..	..	..	27 gr.
Dec. Hordei ..	..	..	..	..	..	..	28 gr.
Dec. Granati Radicis; Papaveris ..	..	..	..	..	..	..	44 gr.
Dec. Sarsæ; Sarsæ Co. ..	..	..	..	..	..	..	55 gr.

In all other cases 22 gr.**Mixtures.***Amount of the active drug contained in, or corresponding to, 1 fluid ounce.*

Mist. Creasoti ..	..	..	..	..	..	..	1 min.
Mist. Ferri Co. ..	..	..	..	..	(of Ferri Sulphas)	..	$2\frac{1}{2}$ gr.
Mist. Scammonii ..	..	..	..	..	..	..	3 gr.
Mist. Guaiaci ..	..	..	..	..	..	..	11 gr.
Mist. Cretæ ..	..	..	..	..	..	..	13 gr.
Mist. Ammoniaci ..	..	..	..	..	..	..	14 gr.
Mist. Sennæ Co. ..	..	..	..	..	(of Magn. Sulphas)	..	88 gr.
Mist. Sp. Vini Gallici ..	..	..	..	..	(of Brandy)	..	3 drachms.

* And 6 min. of Acid. Sulphuric. Dil.

Powders.

See pp. 158, 159.

Confections.

See pp. 159, 160.

Pill-masses.

Amount of active ingredient in 3 grains.

Pil Phosphori	1 $\frac{1}{30}$ gr.
Pil. Hydrargyri; Ferri Iodidi	1 gr.

Amount of active ingredient in 5 grains.

Pil. Aloës Barbadosensis; A. Socotrinae.. .. .	2 gr.
Pil. Aloës et Asafœtidæ	(of both) 1 $\frac{1}{4}$ gr.
Pil. Aloës et Ferri	$\left\{ \begin{array}{l} \text{of Aloes} \\ \text{of F. Sulphas} \end{array} \right.$ 1 $\frac{3}{4}$ gr.
Pil. Aloës et Myrrhæ	$\left\{ \begin{array}{l} \text{of Aloes} \\ \text{of Myrrh} \end{array} \right.$ 1 $\frac{2}{3}$ gr. half as much.
Pil. Asafœtidæ Co.	(of Asafœtida and of Galbanum) 1 $\frac{1}{3}$ gr.
Pil. Cambogiæ Co.	(of Gamboge and of Aloes) 1 gr.
Pil. Colocynthis Co.	$\left\{ \begin{array}{l} \text{of Colocynth} \\ \text{of Aloes} \end{array} \right.$ 1 gr. 2 gr.
Pil. Colocynth. et Hyoseyami	half the above.
Pil. Conii Co.	(of Extract of Hemlock) 3 $\frac{1}{2}$ gr.
Pil. Ferri Carbonatis	(of F. Carb. Sacch.) 4 gr.
Pil. Hydrargyri Subchloridi Co.	(of Calomel and of Sulphd. Antimony) 1 gr.
Pil. Ipecac. cum Scillâ	(of Opium) $\frac{1}{5}$ gr.

Pil. Plumbi cum Opio	{ of <i>Pb. Acetas</i> of <i>Opium</i> ..	$3\frac{3}{4}$ gr. $\frac{5}{8}$ gr.
Pil. Rhei Co.	{ of <i>Rhubarb</i> of <i>Aloes</i>	$1\frac{1}{4}$ gr. 1 gr.
Pil. Saponis Co.	(of <i>Opium</i>)	1 gr.
Pil. Scammonii Co. .. (of <i>Scammony</i> and of <i>Jalap Resins</i>)		$1\frac{1}{2}$ gr.
Pil. Scillæ Co.	(of <i>Squill</i>)	1 gr.

Lozenges.

Amount of active ingredient in each Lozenge.

Troch. Morphine	{ of <i>Morphine</i> ..	$\frac{1}{36}$ gr.
Troch. Morph. c. Ipecac.	{ of <i>Ipecacuanha</i>	$\frac{1}{12}$ gr.
Troch. Opii	(of <i>Extract of Opium</i>)	$\frac{1}{10}$ gr.*
Troch. Ipecacuanhæ		$\frac{1}{4}$ gr.
Troch. Acidi Tannici, Acidi Benzoici		$\frac{1}{2}$ gr.
Troch. Catechu ; Santonini ; Ferri Redacti		1 gr.
Troch. Bismuthi	(of <i>B. Subnitratis</i>)	2 gr.
Troch. Potassii Chloratis ; Sodii Bicarbonatis		5 gr.

Tablets.

Tabellæ Nitroglycerini, Each contains	$\frac{1}{100}$ gr.
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Suppositories.

Amount of active ingredient in each Suppository.

Suppositories of Morphine	..	..	..	..	..	$\frac{1}{2}$ gr.
Suppositories of Carbolic Acid and Opium	..	..	..	..	..	1 gr.
Supp. Plumbi Co.	..	..	..	{ of <i>Opium</i> of <i>Pb. Acetas</i>		1 gr.
						3 gr.
Suppositories of Tannic Acid	..	..	..	..	..	3 gr.
Mercurial Suppository	..	..	..	(of <i>Blue Ointment</i>)		5 gr.

* Containing $\frac{1}{60}$ th gr. of Morphine.

† Containing nearly $2\frac{1}{2}$ gr. of Mercury.

Discs.*Amount of active ingredient in each Disc.*

Lamella Atropinæ	..	..	..	..	..	..	$\frac{1}{5000}$ gr.
Lamella Physostigminæ.	..	..	..	..	..	..	$\frac{1}{1000}$ gr.
Lamella Cocainæ	..	..	..	..	..	..	$\frac{1}{200}$ gr.

Enemas.*See p. 11.***Inhalations.***See p. 10.***Lotions.***See p. 134; Lotio. Hydrarg. Nigra and Lot. Hydr. Flava.***Poultices.***See p. 12.***Liniments.***See p. 166.***Ointments.***Amount of active ingredient in 1 drachm.*

Ung. Aconitinæ, Atropinæ, Veratrinæ	..	..	..	..	..	1 gr.
Ung. Plumbi Acetatis	..	..	..	..	..	$1\frac{3}{4}$ gr.
Ung. Iodi	..	..	..	..	..	2 gr.
Ung. Chrysarobini	..	..	..	..	..	$2\frac{1}{2}$ gr.
Ung. Acidi Salicylici	..	..	..	..	..	2 gr.
Ung. Acidi Carbolici	..	..	..	..	..	3 gr.

Ung. Pot. Sulphuratæ ; Sulphuris Iodidi	4 gr.
Ung. Iodoformi, Belladonnæ (of the "Alcoholic Extact")	6 gr.
Ung. Staphisagriæ (of the Essential Oil)	6 min.
Ung. Pot. Iodidi	6 $\frac{2}{3}$ gr.
Ung. Cantharidis ; Plumbi Carbonatis ; Pb. Iodidi	7 $\frac{1}{2}$ gr.
Ung. Creasoti	7 $\frac{1}{2}$ min.
Ung. Acidi Borici ; Gallæ ; Zinci (of Z. Oxidum)	9 gr.
Ung. Calaminæ	10 gr.
Ung. Glyc. Pb. Subacetatis	10 min.
Ung. Antim. Tartarati ; Cetacei ; Elemi ; Sulphuris	12 gr.
Ung. Resinæ	16 gr.
Ung. Sabine	18 gr.
Ung. Hydrargyri Nitratis Dilutum	1 $\frac{1}{3}$ gr.
Ung. H. Iodidi Rubri	2 gr.
Ung. H. Ammoniati	6 gr.
Ung. H. Nitratis	4 gr.
Ung. H. Oxidi Rubri	7 $\frac{1}{2}$ gr.
Ung. H. Subchloridi	9 gr.
Ung. Hydrargyri Co. (of Mercury)	13 gr.
Ung. Hydrargyri	1 part in 2.
Ung. Terebinthinæ	1 part in 2.
Ung. Picis Liquidæ	5 parts in 8.
Ung. Gallæ cum Opio	{ of Galls 9 gr. (nearly). of Opium .. 4 gr.

EFFERVESCENT DRAUGHTS.

Used to neutralize 20 gr. of—

Potassii Bicarbonas	14 gr. of Acidum Citricum.
Sodii Bicarbonas	17 gr. " "

To neutralize 15 gr. of—

Ammonii Carbonas	17 gr. " "
Magnesii Carbonas	19 gr. " "

To neutralize 10 gr. of—

Lithii Carbonas	20 gr. " "
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$\frac{1}{2}$ oz. of fresh Lemon-juice contains 16 gr. of Acidum Citricum.

INCOMPATIBILITY.

Most cases of chemical incompatibility between drugs treated of in the foregoing pages will be obvious to anyone possessing a rudimentary knowledge of chemistry. The following points it may be as well to direct especial attention to:—

- 1.—Potassium Permanganate is decomposed in presence of organic substances. Nitrate of Silver and Corrosive Sublimate are liable to decomposition in similar circumstances. Nitrate of Silver forms an explosive compound with Creasote.
- 2.—Acidum Nitrohydrochloricum Dil. contains free Chlorine, which is liable to decompose organic colouring and other matters.
- 3.—Spiritus Ætheris Nitrosi decomposes the Iodides and Bromides, blackens solutions of Sulphate of Iron, and decomposes with Guaiac Resin.
- 4.—Chloral and Butyl-Chloral are decomposed by caustic alkalies.
- 5.—Alkaloids are for the most part precipitated from solutions of their salts by caustic alkalies and their carbonates.* The various solutions, infusions, etc., contain the alkaloids in the form of salts. The volatile alkaloids, such as Conine, are liberated by caustic alkalies.
- 6.—Many alkaloids are precipitated by the alkaline Iodides.*
- 7.—Alkaloids are for the most part precipitated by Tannic and Gallic Acids,* or by preparations of drugs containing them.
- 8.—Tannic Acid precipitates with alkalies and their carbonates, with Ferric salts, most metallic salts, Arsenious Acid, Arsenites,* and Tartar Emetic. Gallic Acid blackens solutions of Ferric salts.
- 9.—Preparations of Opium precipitate metallic (not alkaline) salts, and Arsenious Acid.*
- 10.—Solutions of Potassium Tartrate precipitate the Acid Tartrate when acidulated.
- 11.—Gum Arabic forms insoluble compounds with Subacetate of Lead and with Borax. It decomposes Ferric Salts.
- 12.—Resins are precipitated from spirituous solutions on dilution with water (see p. 49).

The presence of free acid in certain preparations should be especially noted.

* It must not, however, be concluded that these precipitates are therapeutically inactive.

THE MEDICINAL USES OF THE PHARMACOPŒIAL DRUGS.

The following pages are intended only to meet the elementary requirements of the Primary Examinations. The more general uses of the drugs are alone given. The student will make a complete study of Pharmacology and Therapeutics at a later period.

INORGANIC DRUGS.

Charcoal is antiseptic and disinfectant (see p. 90).

It is used to purify the surface of unhealthy wounds and ulcers, and the air of sick rooms, especially in infectious cases, and is given internally to relieve flatulence, and to prevent putrid odour in the fæces in intestinal ulceration.

Sulphur is used externally to destroy the parasite causing itch (*scabies*); internally as a laxative.

It is used occasionally in chronic rheumatism and osteo-arthritis, both internally and externally.

Sulphides (*Potassa Sulphurata*, *Calx Sulphurata*) externally have a similar action to Sulphur. Taken internally they hasten suppuration in abscesses, scrofulous glands and acne-pustules.

Phosphorus, **Phosphates** and **Hypophosphites** are used internally as restoratives, Phosphorus being employed especially in diseases of the nervous system; Calcium Phosphate in rickets, where there is a deficiency of that salt in the affected bones; and the Hypophosphites in phthisis and other wasting maladies.

Chlorine, as gas or in solution, is a powerful destructive agent, hence antiseptic and disinfectant. It is used to purify the air of sick rooms, or, as Chlorine Poultice, the surface of wounds and ulcers, or, in solution, as a gargle to the throat in diphtheria and putrid affections.

Chlorinated Lime and Soda are merely vehicles of Chlorine.

Chlorides, as such, have no especial therapeutic action.

Bromine. Action similar to that of Chlorine. Seldom used.

Bromides. The alkaline Bromides lessen sensation and reflex action, calm nervous agitation, lessen spasm, and promote rest and sleep.

They are used especially in the treatment of epilepsy, mania, delirium tremens, hysteria, "nervousness," mental depression, sleeplessness, chorea, asthma, and whooping cough.

In excess they cause debility and acneiform eruptions.

Iodine, locally applied, is caustic and irritant; and is used for "counter-irritation," or to excite adhesive inflammation in the walls of chronic abscesses or dropsical serous cavities.

In solution or diffused into the atmosphere, it is, like Chlorine, antiseptic and disinfectant.

Internally, it promotes absorption, and tends to the lessening of glandular swellings, especially such as are of a scrofulous nature. It is used to reduce such swellings (and in scrofula generally) and to reduce goître.

It is also held to promote the menstrual flow.

Iodides. The alkaline Iodides have no external action. Internally they promote absorption, especially of the effused products of inflammation, of serous effusions and of glandular enlargements; and are used in the treatment of goître and other glandular enlargements, of scrofula, of periostitis, of chronic inflammatory thickenings, and of inflammatory or passive effusion into serous and synovial cavities. They have an especial influence over the lesions of syphilis, rheumatism, gout and osteo-arthritis.

They are used to eliminate mercury and lead from the system in cases of chronic poisoning by those metals.

They are beneficial in asthma. They promote diuresis.

In excess, Iodine and the Iodides give rise to coryza, gastric irritation, and skin eruptions.

Strong Sulphuric, Nitric, Hydrochloric, and Phosphoric Acids and **Glacial Acetic Acid** are powerful destructive agents (*caustics*), and are used in destroying morbid growths.

In the **diluted** form the first four are astringent and tonic. They are used to promote appetite and digestion, and to restore the acidity of the urine.

Hydrochloric Acid is also used to supply a supposed defect of the gastric secretion in dyspeptic conditions.

Sulphuric Acid, as an astringent, is used to check diarrhœa, excessive sweating, and excessive expectoration in bronchitis.

Diluted Nitric Acid is used as an injection to the bladder in cystitis.

Dilute Nitrohydrochloric Acid, in addition to the general action of the dilute mineral acids, exerts a stimulant effect on the liver, and is used, either internally or as a bath, in cases of chronic congestion of that organ.

Boric Acid is an antiseptic agent.

Chromic Acid is an active caustic.

Sulphurous Acid is destructive to low vegetable organisms. It is therefore used as a disinfectant; also to destroy vegetable skin parasites (tinea, chloasma, &c.); and internally to destroy sarcinae and torulæ in the stomach, and to allay flatulence due to fermentative processes.

Sulphites. The alkaline Sulphites have a similar action in the stomach.

Hydrobromic Acid is employed to relieve headache and tinnitus aurium.

Vinegar and diluted **Acetic Acid** are used as external applications to check excessive sweating.

Ether, inhaled, stimulates the heart, the respiration, and the nerve centres. Subsequently it paralyses, first (after a stage of delirium), sensation and consciousness; secondly, reflex motor action.

In excess, it kills, by paralysing respiratory action.

Given by the stomach, a small portion is absorbed, stimulating the heart and respiration.

Ether is frequently given internally as a stimulant to the heart; but its chief use is to produce anæsthesia, or, if desired, complete muscular relaxation, previous to surgical operations.

Applied externally in the form of a spray, its rapid evaporation produces local anæsthesia by freezing the part. Advantage is taken of this for small operations.

Chloroform. The action of Chloroform, inhaled, is similar to that of Ether, but—

1. It acts more speedily and in much smaller amounts.
2. Its stimulant effects are usually less marked, and sometimes wanting.
3. It occasionally produces sudden paralysis of the heart, and consequent death. Its use is therefore attended with greater danger than that of Ether.

Externally, it is an irritant, and is used for counter-irritation in the form of a liniment.

Alcohol, taken internally, produces effects similar to those resulting from the inhalation of Ether, but it is slower in action, the stimulant and deliriant effects last much longer, and the narcotic stage is correspondingly delayed.

It lessens tissue change, and in large amounts lowers the temperature.

It is used, in the form of wine or spirits, as a stimulant to the heart and respiration in a great variety of conditions. In fevers it appears to preserve the tissues from too rapid wasting, and to restrain the temperature. It may also, to some extent, supply the place of food.

Externally, in a diluted form, it is used as a cooling and stimulating lotion to bruises and strains.

Nitrous Ether augments the sweat and the flow of urine.* It is used in the treatment of catarrhal affections, of renal diseases and of dropsy.

Acetic Ether and **Spiritus Ætheris Co.** are general stimulants, like Ether and Alcohol. The former is diuretic.

Chloral Hydrate produces a condition resembling natural sleep, and is used for this purpose.

Butyl-Chloral Hydrate, in small doses, relieves irritable cough; in full doses, it relieves "neuralgic" pain in the branches of the 5th nerve.

Iodoform is antiseptic and deodorant, and a local anæsthetic. It is applied to poisoned wounds, syphilitic sores and fungating growths, to procure healthy action, and is used as an antiseptic dressing in surgical operations. It is given internally in the treatment of scrofula and tubercle.

Amyl Nitrite relaxes the arterioles of the surface, drawing blood away from the deeper organs. It is used to relieve angina pectoris, asthma, and the pain of heart disease.

Pix Liquida, as a local stimulant, is effectual in some chronic skin diseases, especially psoriasis. It allays itching.

Carbolic Acid, in the concentrated form, is caustic and escharotic. Seldom used for this purpose.

In solution it is antiseptic and disinfectant. It is extensively used as a general disinfectant, and to prevent the entrance of germs into wounds, abscesses, and the seats of surgical operations. As an inhalation, it is employed to purify phthisical cavities and dilated bronchi, or to prevent the extension of diphtheritic membrane.

* Probably by dilating the afferent arterioles of the malpighian bodies.

It is locally anæsthetic. When employed as an inhalation it relieves cough and irritation in the throat. It is used to allay pain in carious teeth.

The alkaline **Sulphocarbates** are antiseptic and disinfectant. They may be taken internally, and are used in the treatment of pyæmia and other septic diseases.

Creasote. Action similar to that of Carbolic Acid, but less powerful as a disinfectant. Chiefly used as an inhalation to phthisical cavities and dilated bronchi, to allay pain in carious teeth, and to check vomiting.

Salicylic Acid is antiseptic and disinfectant.

Salicylic Acid and the alkaline **Salicylates** reduce the temperature in simple, and to a less degree in specific, fevers; and cut short the pain and pyrexia in acute and sub-acute rheumatism. Occasionally they are found to relieve gout, chronic rheumatism, osteo-arthritis, and glycosuria.

In excess they cause deafness, tinnitus aurium, and headache, sometimes tremor and delirium.

Citric Acid, and occasionally **Tartaric**, are used to make effervescing draughts (see p. 191).

Tannic Acid is strongly astringent and styptic, and is employed locally in inflammatory affections of the throat, and to check hæmorrhage from the nose, stomach, or rectum.

Gallic Acid is astringent, but not styptic. It is absorbed from the alimentary canal, and is used when an internal astringent is required, as in checking hæmorrhage from the lungs, kidneys, or intestines, or in stopping diarrhœa.

Lactic Acid is used locally to dissolve diphtheritic membrane; internally in place of Hydrochloric Acid in dyspepsia.

Hydrocyanic Acid is a local anæsthetic. It is used internally to relieve gastric irritation and vomiting, externally to allay itching, and as an inhalation for irritable cough.

In excess it causes speedy death by paralysis of respiration and of the heart.

Collodion is used to form an impervious coating to wounds or irritable surfaces. It contracts in drying. "**Collodium Flexile**" does not contract.

Nitroglycerine has the same action and uses as Nitrite of Amyl (p. 196), but it is slower in its operation, and its effects are less transitory.

METALLIC COMPOUNDS.

Potassium and **Sodium** in combination probably exercise no medicinal influence.

For the action of their **Iodides**, see p. 194.

For the action of their **Bromides**, see p. 194.

For the action of **Sod. Sulphite**, see p. 195.

For the action of **Sod. Hypophosphite**, see p. 193.

For the action of **Sod. Salicylate**, see p. 197.

For the action of **Sod. Arseniate**, see p. 203.

For the action of **Sod. Valerianate**, see p. 208.

For the action of **Sod. Sulphocarbolate**, see p. 197.

For the action of **Potassa Sulphurata**, see p. 193.

For the action of **Liq. Sodæ Chlorinatæ**, see p. 194.

Caustic Potash and **Soda**, and **Liq. Sodii Ethylatis** are destructive to organic tissues, and form eschars. The first is used in making issues, the second hardly in medicine, the last to destroy nævi.

The **Carbonates** possess a similar but feebler caustic power.

Liq. Potassæ, but more frequently **Sodium Bicarbonate**, is used to neutralise abnormal acids in the stomach in dyspeptic conditions, or to stimulate the gastric secretion* in enfeebled digestion.

The **Bicarbonate** and the **Organic Salts** of **Potassium** (less frequently of Sodium) are used to convey alkali to the blood, tissues, and secretions for the following purposes chiefly:—

1. To neutralise the supposed poison (lactic acid) of rheumatism.
2. To aid in eliminating the uric acid believed to be present in excess in gout.
3. To dissolve and remove chalkstones, which consist of urate of sodium, a salt less soluble than potassium urate.
4. To dissolve and remove uric acid gravel or calculi in the kidney, ureter or bladder.
5. To neutralise excess of acid in the urine.
6. To restore alkali to the tissues in lardaceous infiltration and scurvy.

The organic salts become carbonates in the system.

* As a general principle acid glands are stimulated to secrete by the local application of alkalies, while their secretion is lessened by acids. With alkaline glands the reverse obtains.

The **Nitrates** and **Acetates** promote diuresis. The former promote sweating.

Potassium Chlorate, locally applied, destroys the organisms that produce "aphthous" ulcers in the mouth. It is also used with benefit in tonsillitis, and in all forms of catarrh or ulceration of the mouth or pharynx.

Borax has a similar action on aphthæ. It is also employed to destroy chloasma, and to allay itching in various skin diseases.

Potassium Permanganate is destructive of organic tissues, and is used as a disinfectant and deodorant. Internally, it is said to promote the menstrual flow.

The following salts are hydragogue purgatives in sufficient doses—

Potassium Sulphate, Tartrate, and Acid Tartrate; Sodium Sulphate and Phosphate; and Soda Tartarata.

Lithium Carbonate and **Citrate** are used in place of Potassium salts to dissolve and remove uric acid or urate of sodium. The citrate is used as a lotion to chalk-stones for the same purpose.

Ammonia, externally applied, is a strong irritant, and is used for counter-irritation. In concentrated form, it blisters.

Applied to the nostrils, it stimulates (reflexly) the heart and nerve centres. It is used in this way in syncope, shock, exhaustion, and opium poisoning.

Internally **Ammonia** and **Ammonium Carbonate** stimulate and quicken the heart and the respiration. They are used as general stimulants in a variety of conditions.

They are reputed to aid expectoration, and are much used in bronchitis for this purpose.

In large doses the **Carbonate** is emetic.

The **neutral salts of Ammonium** possess the stimulant properties of Ammonia to a very slight degree, if at all.

For the action of the **Bromide**, see p. 194.

For the action of the **Benzoate**, see p. 206.

The **Acetate** and **Citrate** are diuretic.

The **Chloride** is reputed to stimulate the liver, and to relieve neuralgia and chronic rheumatism.

The **Phosphate** dissolves and carries away deposits of urates or uric acid.

Iron. Of the officinal compounds, the following are astringent and styptic, viz., the **Sulphate**, the **Perchloride**, the **Pernitrate**, the **Persulphate**, the **Carbonate**, and the **Peroxide**.

All are used to arrest hæmorrhage externally, or in the alimentary canal. The soluble salts are employed as astringent applications to the throat, and internally to check diarrhœa.

Reduced Iron is also astringent when taken internally.

The **Pernitrate** and **Persulphate** are seldom given internally.

The plaster of the **Peroxide** is used as an external stimulant.

The **Sulphate** is used as a disinfectant.

Iron and its salts, but especially the astringent ones, promote the formation of the red blood-corpuscles, and are given internally in large doses to counteract anæmia, a condition involving a deficiency of these corpuscles, and in amenorrhœa, which is often due to anæmia.

All the **Iron** compounds are tonic in small doses.

The **Iodide** combines the properties of an iodide (p. 194) with those of iron; the **Phosphate** those of a phosphate (p. 193); the **Arseniate** those of arsenic.

The **Acetate** is diuretic.

The **Perchloride**, in full doses, is believed to arrest erysipelas.

The **Peroxide** is an antidote to arsenic. It should be freshly prepared.

Mercury. Corrosive Sublimate is an active caustic, and is used to remove malignant growths, &c.

In dilute solution it is a powerful antiseptic and disinfectant. It is now much used for these purposes. It is also strongly astringent.

White Precipitate is used only to destroy pediculi.

The **Red Iodide**, locally applied, is a strong irritant. It is especially used in India as an application to goître.

The **Acid Solution** of the **Nitrate** is a strong caustic, and is used in destroying small growths or the surface of unhealthy sores.

The **Ointments** of the **Nitrate** and the **Oxides** are used as stimulant applications (? parasiticide also) to the eyelids in blepharitis, and to various skin eruptions.

Black and Yellow Wash are used as stimulant applications to ulcers and syphilitic sores.

Mercury may be given internally (1) by the mouth, as *Hyd. c. Cretâ*, *Blue Pill*, *Red Iodide*, *Perchloride* or *Calomel*, (2) by inunction of mercurial ointment or of the oleate, (3) by the rectum, as a suppository, (4) by fumigation with calomel, (5) by dusting calomel on open sores.

Its constitutional action is the same in all cases. It decreases the fibrinogenous elements of the blood, promotes cell proliferation, and stimulates absorptive action.

It is used in inflammations, chiefly in iritis, to keep the exudation fluid, to prevent adhesions, and to procure absorption.

It is contra-indicated during active suppuration, in *diffuse* inflammation, and in scrofulous affections, where cell proliferation is active.

Further, it is regarded as antidotic to the virus of syphilis; and is used in all stages of this disease, though more frequently in the earlier than the later.

In excess, it produces either (1) salivation and swelled gums, running on to inflammation of the mouth and fauces, or (2) severe cachexia, or (3) tremors, or (4) necrosis of the jaw.

Calomel, **Blue Pill**, and **Hyd. c. Cretâ**, in full doses, are *cholagogue purgatives*, producing copious evacuations containing much bile. Their purgative action is chiefly on the upper part of the small intestine.

Calcium. Unslaked Lime is used as a caustic to destroy malignant growths.

Calcium compounds are somewhat astringent. **Carron Oil** (*Lin. Calcis*) is a common application to burns.

Lime-water and **Chalk** are used to check diarrhœa.

Also to neutralize acid in the stomach, and as antidotes to oxalic acid.

Lime and the **Phosphate** are used to supply lime salts to the bones in the treatment of rickets.

For the action of the **Hypophosphite**, see p. 193.

For the action of the **Calx Chlorinata**, see p. 194.

For the action of the **Calx Sulphurata**, see p. 193.

Zinc. The **Chloride** is a powerful caustic, also antiseptic and disinfectant. In solution it is astringent, and is locally used as an application to the larynx.

The **Sulphate**, **Acetate** and **Sulphocarbolate** are astringent, and are used locally in catarrh of the conjunctiva, urethra or vagina.

The **Oxide** and **Carbonate** are used, in powder or ointment, as mildly astringent applications to wounds, ulcers and inflamed surfaces, and acute skin diseases. The **Oleate** is used for the same purpose.

Internally **Zinc** is used with benefit in the treatment of functional nervous diseases, especially chorea and epilepsy.

The **Oxide** checks excessive sweating.

The **Sulphate** and **Acetate** in large doses are emetic.

For the action of the **Valerianate**, see p. 208.

Lead. The **Iodide** is used as an external stimulant or irritant.

The **Acetate** and **Carbonate** have the same action, and are used externally for the same purposes, as the corresponding Zinc Salts. The **Subacetate** is astringent also, and is commonly applied to bruised and inflamed structures.

The **Acetate** alone is used internally, to check internal hæmorrhage, severe diarrhœa, or excessive sweating.

The **Bismuth** compounds are used internally as astringents and sedatives in the treatment of dyspepsia and diarrhœa.

Antimony. The **Chloride** is a powerful caustic.

Antim. Sulphuratum and the **Oxide**, taken internally, promote sweating; and have been used to cut short catarrhs and feverish attacks.

Tartar Emetic, applied externally, is a severe irritant, producing pustules. It is used for counter-irritation to deep-seated inflammation.

Internally, in small doses, it weakens the heart's action, lowers the arterial tension, and promotes sweating and expectoration. It has been used to cut short catarrhs, inflammations, and fevers, especially pericarditis, pneumonia, pleurisy, and diphtheria, and to relieve the first (dry) stage of bronchitis.

In larger doses it is a nauseating emetic. It is used to dislodge false membrane in diphtheria and accumulations of mucus in bronchitis, and to cut short attacks of ague.

Arsenious Acid in the solid form is caustic. It is used in destroying malignant growths.

Arsenic and the **Arsenates**, taken internally in small doses, promote appetite and digestion, stimulate nutrition, especially in the skin, and induce the formation of red blood-corpuscles.

They are used—

1. In the treatment of dyspepsia and vomiting.
2. In anæmia, wasting diseases, and cachexia, especially in that due to malaria.
3. In chronic skin diseases.
4. In functional nervous diseases, especially chorea, asthma, neuralgia and hysteria.
5. In pemphigus, which is possibly a disease of nervous origin.
6. In ague, over which they are held to exercise a specific action.

In excess, they produce *irritation* of the alimentary canal (gastric pain, vomiting and diarrhœa), of the respiratory mucous membrane (cough, hoarseness, oppressed breathing, sore nose), and of the eyelids (soreness of the edges).

Donovan's Solution combines the actions of Arsenic and Mercury.

Magnesium. Magnesia and the **Carbonate** are used, like Sodium Bicarbonate, to neutralize acid in the stomach.

The **Carbonate** is a laxative, and the **Sulphate** a hydragogue purgative.

Alum is astringent, and is used for the same purposes as Sulphate of Zinc and Acetate of Lead.

Desiccated Alum is mildly caustic, and is used to destroy unhealthy granulations.

Nitrate of Silver is mildly caustic and stimulant. It is chiefly used locally, to produce a protecting coating over inflamed tonsils, to destroy unhealthy granulations, and to stimulate sluggish ulcers and "granular lids."

In dilute solution it is astringent, and is chiefly used in relaxed throat and laryngitis.

Internally it is used as an astringent to gastric ulcers, and in the treatment of functional nervous diseases, especially epilepsy and chorea. It is liable to discolour the skin.

"**Argenti et Potassii Nitras**" is designed to effect a milder local action than the pure silver salt.

Oxide of Silver checks vomiting.

Nitrate and Sulphate of Copper in the solid form are stimulant and slightly caustic. The latter is used as an application to "granular lids," and as a disinfectant.

In dilute solution they have the same action, and are used for the same purposes, as Sulphate of Zinc.

The **Sulphate** is given internally to check hæmorrhage from the bowels, and has been used in the treatment of functional nervous diseases.

In large doses it is emetic.

Oxalate of Cerium is used to check vomiting.

The following recapitulatory categories may be useful:—

1. Caustics & Destructives—

Chlorine.
Iodine.
Strong Sulphuric, Nitric, Hydrochloric, and Phosphoric Acids.
Chromic Acid.
Glacial Acetic Acid.
Carbolic Acid.
Caustic Potash, Soda, Ammonia, and Lime.
Potassium and Sodium Carbonates.
Potassium Permanganate.
Liq. Sodii Ethylatis.
Corrosive Sublimate.
Liq. Hydrarg. Nitratis Acidus.
Zinc Chloride.
Antimony Chloride.
Arsenious Acid.
Desiccated Alum.
Nitrate of Silver.
Nitrate and Sulphate of Copper.

2. Antiseptics and Disinfectants—

Charcoal.
Chlorine, Bromine, and Iodine.
Boric Acid.
Sulphurous Acid and Sodium Sulphite.
Iodoform.

Carbolic Acid.
Sodium Sulphocarbolate.
Creasote.
Salicylic Acid.
Potassium Permanganate.
Iron Sulphate.
Corrosive Sublimate.
Zinc Chloride.
Copper Sulphate.
Potassium Chlorate and Borax (p. 199).

3. Inorganic Astringents—

The Dilute Mineral Acids.
Acetic Acid.
Chromic Acid.
Tannic* and Gallic Acids.
Iron Sulphate,* Perchloride,* Persulphate,* Pernitrate,* Carbonate, and Peroxide.*
Corrosive Sublimate.*
Lime and Chalk.
Zinc Salts.*
Lead Acetate,* Subacetate, and Carbonate.
Bismuth Salts.
Alum.*
Silver Nitrate.*
Copper Salts.*

* Styptic also.

4. Inorganic Purgatives—*Laxative—*

Magnesium Carbonate.

Cholagogue—

Mercury and Calomel.

*Hydragogue—*Potassium Sulphate, Tartrate, and
Acid Tartrate.

Sodium Sulphate and Phosphate.

Soda Tartarata.

Magnesium Sulphate.

Tartar Emetic.

Copper Sulphate.

6. Local Stimulants and Irritants.

(See below.)

a. Mercurial Oxides, the Ointment of the
Nitrate, and the Oleate.

Acetic Acid and other Diluted Acids.

Alcohol.

Pix Liquida, Creasote.

b. Nitrate of Silver.

Chloroform.

Ammonia.

Red Iodide of Mercury.

Iodine.

Tartar Emetic (*pustulant*).**5. Inorganic Emetics—**

Ammonium Carbonate.

Zinc Sulphate and Acetate.

ORGANIC DRUGS.

Of the drugs derived from the organic kingdoms some may be conveniently considered in categories, as follows :—

- 1. External Stimulants, Rubefacients, Irritants, and Vesicants** are drugs applied externally, in liniment, ointment, or plaster, either to stimulate sluggish reparatory processes, or to relieve localised affections by counter-irritation. It is not possible to draw a definite line between stimulant, rubefacient (*i.e.*, skin-reddening), and irritant drugs, as one action passes into the other, according to the strength of the preparation or the duration of its application. The following list is roughly arranged in groups, proceeding from the milder stimulants to the severer irritants :—

a. **Rosin.****Burgundy Pitch.****Frankincense.****Elemi.****Ammoniac** (*for internal action, see p. 206*).**Galbanum.****Nutmeg-butter.**

b. Camphor (*for internal action, see p. 212*).

Oil of Cajeput.

Capsicum (*for internal action, see p. 207*).

Mustard.

Horseradish.

Oil of Turpentine (*for internal action, see p. 212*).

Savin. Used especially to keep blisters open.

Veratrine. Anæsthetic also (*see p. 215*).

c. Cantharides. } (*Vesicants.*)
Oil of Mustard. }

d. Croton Oil. (*Pustulant. For internal action, see p. 208.*)

2. The following drugs are **stimulant to mucous membranes**, and are used in the treatment of chronic catarrhal conditions of the different mucous tracts :—

*a. Benzoic Acid.**

Benzoin.

Storax.

Tolu.

Fir-wood Oil.

Oil of Turpentine.

*The above by inhalation or internally ;
the rest internally only.*

Peruvian Balsam.

Ammoniacum.

For the respiratory tract, in chronic bronchitis, tracheitis and laryngitis. These are generally, but inappropriately, styled "*stimulating expectorants.*"

Benzoic Acid* is also antiseptic and diuretic. *Tr. Benzoini* Co. is employed as an application to wounds, and Benzoic Acid is given internally to render the urine acid.

b. Buchu. }
Pareira. } For the bladder, in chronic cystitis.

c. Cubebs. }
Copaiva. } For the urethra, in gonorrhœa.
Oil of Sandal-wood. }

* The internal action of **Ammonium Benzoate** is the same as that of Benzoic Acid.

3. **Ginger, Capsicum, and Pepper**, are active stimulants to the gastric functions. Ginger is given for flatulence and colic. Capsicum is employed to relieve the "sinking" feeling and craving for drink of chronic alcoholism. Confection of Pepper is an often-used remedy for piles.

The following aromatic drugs are slightly stimulant to the stomach, and tend to prevent flatulence and nausea. They are called "**Carminatives**:"—**Orange, Caraway, Cardamoms, Chamomile, Cinnamon, Coriander, Clove, Dill, Nutmeg, Pimento**, and the **Oils** derived from them; the **Oils** of **Lemon, Lavender, Peppermint**, and **Spearmint**.

4. **Bitter Tonics**:—**Calumba, Cascarilla, Chiretta, Cusparia, Gentian, Hop**, and **Quassia** stimulate appetite and gastric digestion, and cause thereby a feeling of increased vigour and well being.

The same property is exercised by small doses of **Cinchona** or its alkaloids, **Nux Vomica** or **Strychnine**, **Salicin**, and **Beberine** (pp. 214, 215, 212, and 213).

Quassia has a special influence on the large bowel, removing the relaxed condition that allows thread worms to breed.

5. Astringents.

The following drugs depend for their action on the Tannin or Tannic Acid they contain:—**Catechu, Kino, Galls, Bael** fruit, **Pellitory** and **Rhatany** roots, **Bearberry** leaves, **Oak, Larch** and **Pomegranate** barks, **Logwood**, and **Red-rose** petals.

All are used to check diarrhoea; **Bael** is especially employed in dysentery; decoction of **Oak** bark is a customary vaginal injection; **Catechu** and **Rhatany** are prescribed in the form of lozenges for relaxed throat and laryngitis; **Acid Infusion of Roses** is a frequent ingredient of gargles for relaxed throats.

Pomegranate-bark is used to destroy tape-worms.

6. Parasiticides and Anthelmintics.

Stavesacre ointment is destructive to pediculi.

Oil of Male Fern, Koussou, and **Wurru**, taken internally, destroy tape-worm.

Santonin destroys round and thread-worm.

Turpentine and **Pomegranate-bark** (pp. 212, 207), are also used to destroy tape-worm.

Turpentine, Scammony and **Quassia** (pp. 208, 207), to get rid of thread-worms.

7. **Valerian** (and the **Valerianates**), **Musk**, **Sumbul**, **Rue**, and **Asafoetida**, by the powerful impression they make on the sense of smell,* tend to control the manifestations of hysteria, and are used internally for this purpose.

Asafoetida, in pill or enema, and **Oil of Rue**, in mixture or enema, are used to stimulate the lower bowel, and prevent accumulation of flatus.

Chamomile is used for a similar purpose, and also as a "carminative" (see p. 207).

8. **Laxatives and Purgatives.**

Figs, **Prunes**, **Tamarinds**, and **Manna** are *laxative*, i.e., produce gentle moist evacuations.

Castor Oil, **Senna**, **Scammony**, **Taraxacum**, **Rhamnus Frangula**, and **Cascara Sagrada** are simple *purgatives*, i.e., produce abundant more or less fluid evacuations, without much pain or griping.

Scammony is especially used in children to expel thread-worms.

Podophyllin, **Rhubarb**, **Cassia**, and **Aloes** are *cholagogue purgatives*, augmenting the flow of bile as well as purging.

Podophyllin and **Rhubarb** act most on the upper part of the small intestine; **Aloes** on the lower part of the large bowel.

(**Aloes** produces a general determination of blood to the pelvic organs, and tends to induce the menstrual flow. It is used therefore to bring back this function when absent.)

Jalap, **Colocynth**, **Elaterium** (or **Elaterin**), **Gamboge**, and **Croton Oil** are *hydragogue purgatives*, i.e., they produce copious watery evacuations.

They are therefore used to abstract fluid from the system in dropsy, and to eliminate effete material from the blood in cases of kidney disease, in which such material is liable to be retained.

Jalap and **Colocynth** are cholagogue as well.

These vegetable hydragogues are powerful purgatives, and are liable to cause much griping. They are often spoken of as **drastic** purgatives.

The remaining organic drugs are discussed nearly in the order in which they are given in the previous part of the work. Those that furnish an active principle to the Pharmacopœia are considered under that active principle.

* Their odorous principles are eliminated in the breath.

Pepsin is used to supply a supposed deficiency of Pepsin in enfeebled or painful digestion.

Ox-gall is (seldom) used to supply the deficiency of bile in the duodenum in obstructive jaundice.

Spermaceti is an unguent of pleasant feeling and odour.

Cod-liver Oil is a restorative, used in all conditions of weakness or wasting. It is of especial benefit in phthisis, scrofula, and chronic rheumatism.

Ergot produces contraction of the smaller arteries (arterioles), and also of the womb.

It is used (1) to hasten parturition, and to procure contraction of the womb after delivery; (2) to check hæmorrhage from the lungs, nose, womb, &c.; (3) to check diabetes insipidus, a condition involving dilatation of the arteries of the kidney.

Yeast is used to stimulate digestion, or to stimulate sluggish ulcers.

Iceland Moss is a food.

Lettuce is believed to be slightly soporific.

Lobelia is a nauseating emetic. It is used in moderate doses to relax the spasm of the bronchial muscles in asthma.

Broom augments the flow of urine.

Indian Hemp produces disturbances of the higher cerebral functions, varying much in character in different individuals and different races. In some people a splitting headache is its only result. Among the Malays it causes furious delirium. Generally in Europeans it brings on a dreamy state, with confusion of consciousness, especially as to time and place, passing visions, and loss of common sensation, the feelings being usually of pleasurable character.

It is used to relieve headache and to cut short asthma, which it sometimes succeeds in doing; or as a substitute for opium to relieve pain and produce sleep.

Conine, on which the action of **Conium** depends, locally applied, paralyses the sensory terminals. It is used in the form of Hemlock Poultice to relieve pain, and in that of Inhalation of Conine to allay irritable cough or asthmatic spasm.

Internally, it paralyses the motor terminals, producing muscular weakness; or, in excess, complete muscular paralysis, and death by stoppage of the respiratory movements.

Conium has been used in the treatment of tetanus, chorea, paralysis agitans, and spasmodic torticollis, but without much success.

also a
cure of brach

Digitalis augments the muscular power of the heart, slows its rate by stimulating the vagus, and contracts the small arteries.

The total work done by the heart is increased, the arterial tension raised, and the venous pressure lowered.

If dropsical effusion is present, the lowering of the venous pressure aids its absorption.

The rise of arterial tension increases the flow of urine, provided that the contraction of the small arteries of the kidney do not prevent the malpighian tufts sharing in it. The action of *Digitalis* in this respect is very uncertain.

Digitalis may be used in all cases of weakness, irregularity, or undue rapidity of the heart that do not depend on pericarditis or advanced fatty degeneration, or are not associated with marked arterial degeneration or aneurism. On degenerated heart-muscle it has no influence; aneurisms or degenerated arteries may be ruptured by its action.

Its most marked influence is over irregularly-acting dilated hearts, particularly those resulting from mitral incompetence, and over functional "palpitation." In disease of the aortic valves it is of much less service, as its use is in such cases seldom called for till degeneration of the heart-wall has gone so far as to render it useless.

It is seldom of service in aortic regurgitation.

Digitalis is used to procure absorption of dropsical effusion, whether dependent on heart disease or not.

It is employed as a diuretic in renal diseases, sometimes in combination with Nitrous Ether, which counteracts its contracting effects on the renal arterioles, and allows free passage of the blood to the malpighian tufts (see p. 196).

It has been used in large doses in the treatment of delirium tremens.

It is liable to accumulate in the system, and toxic symptoms may therefore unexpectedly show themselves during administration. The earliest are usually dryness of the throat, vomiting, and faintness.

Henbane has an action allied to that of *Belladonna*, but feebler. It is used as a sedative to aid the action of purgatives and prevent griping, and to allay pain in the bladder.

Matico is used as a mechanical styptic, the down on its surface inducing coagulation of blood.

Tobacco is a powerful nauseating emetic, not now used in medicine.

Arnica is used as a local application to bruises. Its influence is doubtful.

Cimicifuga is reputed to check acute rheumatism.

Colchicum has the power of controlling gout. The mode of its action is unknown.

It is a purgative, but is not used for this purpose.

Gelsemium is used in the treatment of neuralgia, migraine, toothache, and chronic rheumatism.

Ipecacuanha in small doses augments the secretion of the mucous membranes, that of the respiratory tract in particular.

In catarrh of this tract it relieves the congested vessels to a slight degree by increasing its secretion, and aids expectoration by rendering the products more fluid.

It is extensively used in the treatment of bronchitis and coughs of all kinds, but the mode of its curative action is not fully explained by the above physiological effects.

In large doses it is a prompt and safe emetic.

In conjunction with opium, as in Dover's Powder, it induces free perspiration.

In doses of 7 grs. and upwards, it checks dysentery; in what manner is not known.

Sarsaparilla is used to combat cachexia, especially when dependent on syphilis.

Mezereon, **Sassafras**, and **Guaiac** are credited with a similar influence.

Squill has an action on the heart and arteries similar to that of *Digitalis*. Its effects on the urine are more marked. It is used, in combination with *Digitalis*, in the treatment of dropsy.

Squill and **Senega** are much used in the treatment of coughs and bronchitis, and appear to aid expectoration.

Veratrum Viride depresses the force of the heart's action, and lessens arterial pressure. It is used (but seldom in this country) to cut short inflammations, fevers, and paroxysms of gout.

It is liable to cause vomiting and purging.

Aniseed and its oil are sedative to the respiratory mucous membrane, and are employed to relieve cough and asthmatic spasm.

Poppy Capsules contain a small proportion of the opium alkaloids. Syrup of Poppies is given to children as a sedative; Decoction of Poppies is used as an application to the eyes in conjunctivitis.

Stramony has an action allied to that of *Belladonna*, though feebler. It has an especial power of relaxing asthmatic spasm, and is used mainly for this purpose.

Eucalyptol is antiseptic and disinfectant, and is employed as such in surgery; as a spray in cases of diphtheria, and as an inhalation to phthisical cavities and dilated bronchi.

It has been credited with the power of counteracting malaria, but on slender grounds.

Oil of Juniper augments the flow of urine.

Oil of Turpentine externally is a powerful counter-irritant (p. 206).

Internally—(1) it is a stimulant to the respiratory mucous membrane, checking catarrh; (2) it checks hæmorrhage from the nose, lungs, stomach, intestines, kidneys, or uterus; (3) it augments the flow of urine; (4) it destroys tape-worm.

It is used for all these purposes.

Guaiac is beneficial in chronic rheumatism, chronic gout, and tonsillitis.

Its mode of action in these three conditions is unknown. Like Sarsaparilla, it appears to combat cachexia (p. 211).

It is a purgative, and is occasionally used as such in combination with other drugs.

Myrrh is astringent, and the tincture is used as a wash to inflamed gums. In combination with Iron or Aloes, it aids in inducing the menstrual flow.

Chrysophanic Acid, the active principle of **Goa-powder**, has a curative action on psoriasis when locally applied. The nature of the action is unknown, but is probably of a stimulant character. In excess it may produce irritation and oedema.

Camphor is used externally as a counter-irritant (p. 206).

Internally it is a stimulant to the heart and the nerve centres. It is used as such in the same conditions as alcohol.

It tends to check diarrhoea and nasal catarrh.

In excess it causes delirium.

Menthol is a local anæsthetic, and is chiefly used to relieve superficial neuralgia.

Thymol is an antiseptic and disinfectant.

Salicin is a bitter tonic. Its further action is similar to that of Salicylic Acid and the Salicylates (p. 197).

Aconitine, on which the properties of **Aconite** depend, is a powerful local anæsthetic, and is used externally to relieve neuralgia and chronic rheumatism.

Internally it lessens sensation, weakens the action of the heart and lowers arterial tension, promotes sweating, and lowers the temperature. It is used to relieve neuralgia and migraine, and to cut short catarrhal, inflammatory and febrile diseases.

Aconitine is given internally, and most often externally, in the form of a preparation of *Aconite*. The alkaloid is only used in the ointment.

Atropine, on which the properties of **Belladonna** depend, has a similar local action to that of Aconitine.

It also contracts the arterioles and lessens the blood supply of the part to which it is applied, and checks the secretion of sweat. Applied to the breasts it checks lactation.

Applied to the eye, it dilates the pupil and paralyses the intrinsic muscles.

It is used externally to allay pain, to check commencing inflammation, excessive sweating, and lactation; to paralyse the eye temporarily to allow of ophthalmoscopic examination, and to dilate the pupil for the same purpose, and also to avoid adhesion of its edges in iritis.

Internally it lessens sensation and spasm, quickens the heart, stimulates respiration, raises the temperature, checks the secretion of mucus, saliva, sweat and milk, and, by paralysing the splanchnic inhibitory nerves, augments the peristalsis of the intestines.

It is excreted by the urine, and exercises a local sedative influence on the bladder.

It is used internally—

1. To allay pain and cough, and to relieve asthma, renal and hepatic colic, and other conditions of spasm.
2. To stimulate the respiration in lung diseases and in opium poisoning.
3. To check secretion in bronchorrhæa, and to stop excessive sweating.
4. As an adjunct to purgatives.
5. To relieve (locally) pain in the stomach, kidney, or bladder.
6. In the treatment of epilepsy, chorea and whooping-cough.

Atropine is usually given internally, and most often externally in the form of a preparation of *Belladonna*. The alkaloid is used to apply to the eyeball, or externally as ointment, or internally by injection.

In excess, it causes dryness of the throat, passing into inflammation, pyrexia, delirium, and a rash resembling that of scarlatina. The pupils are dilated.

Beberine is a bitter tonic. In large doses it is reputed to counteract malaria, but it is little used now for this purpose.

Caffeine stimulates the cerebral functions, quickens the heart's action and the respiration, raises the blood pressure, and increases the flow of urine.

It is used in the treatment of heart and kidney diseases, in migraine and asthma, and as a general restorative.

Cocaine is an effectual local anæsthetic, and is used to paralyse sensation previous to operations on the eye, or superficial operations elsewhere.

Coca is used to relieve gastric pain or "sinking," to produce a feeling of vigour and well-being, and to enable fatigue to be well borne.

The **Cinchona Alkaloids** are bitter tonics, and are largely used as such.

In full doses they possess, especially **Quinine**, the power of counter-acting malaria, and are used in the treatment of ague and all malarial affections.

Quinine, moreover, hinders tissue change and lowers the temperature. It is used accordingly in the treatment of fevers and inflammations.

It is an antiseptic, and is used locally as an injection to the external cavities of the body, and internally in the treatment of pyæmia and other septic affections.

In excess, it causes deafness, tinnitus aurium, and headache.

Codeine has a powerful anæsthetic action on the intestines. It relieves cough, and is narcotic, but far less so than Morphine. It has been employed in the treatment of glycosuria, which it has the property of checking.

Morphine, on which the action of **Opium** chiefly depends, has a local anæsthetic effect, but much less than Cocaine or Aconitine.

Opiate lotions, liniments, ointments and suppositories are used in the relief of pain. A weak lotion is applied to the eyes in conjunctival catarrh.

Internally, Morphine relieves pain to a greater degree than any other drug.

It produces sleep.

It checks catarrh.

It cuts short slight inflammations and relieves slight febrile conditions.

It allays cough.

It augments the perspiration, especially in combination with Ipecacuanha.

It is used for all the above purposes.

It checks secretion generally, except as regard the sweat. In full doses it contracts the pupil.

The action of **Opium** is mainly that of Morphine, but in addition it checks the secretion and peristalsis of the alimentary canal, and suppresses the flow of bile; causing anorexia and constipation to a much greater degree than the alkaloid.

These effects may be due to the insoluble constituents of the Opium keeping the alkaloid long in contact with the walls of the canal before absorption.

Opium is very useful in checking diarrhœa and in restraining intestinal movements in cases of peritonitis or of wound. For most other internal uses Morphine is preferable.

Physostigmine, the active principle of **Physostigma**, locally applied, contracts the pupil, and is used to effect this after Atropine has been employed to dilate it.

It also paralyses the motor centres of the spinal cord; and Physostigma has, accordingly, been employed in the treatment of tetanus.

Pilocarpine, or **Jaborandi**, of which it is the active principle, produces a profuse flow of sweat and saliva.

It is used with this end in the treatment of uræmia, in catarrhs, and in suppressed exanthemata to induce the eruption.

The alkaloid is usually given subcutaneously.

Strychnine is a bitter tonic, and is used as such in small doses.

It stimulates the respiratory centre, and is used in pulmonary diseases for this purpose.

In large doses it stimulates the motor centres of the spinal cord. It has accordingly been employed in treating chronic diseases of the cord.

In toxic doses it produces tetanus.

The action of **Nux Vomica** is mainly that of Strychnine. It contains another alkaloid, *Brucine*, which is also a bitter tonic.

Veratrine is used as a local anæsthetic and counter-irritant in neuralgia and rheumatism.

Apomorphine, administered subcutaneously, produces speedy vomiting, without nausea, by an action on the nerve centres.

INDEX.

The "Popular Designations" given alphabetically on pp. 170, 171, are not repeated in the Index.

The Chapter on "Medicinal Uses" of drugs is indexed separately at the end of the General Index.

-
- | | |
|--|---|
| <p>Acaciæ Gummi, 53, 78
Aceta, 7
Acetic Acid, 106
Acetic Ether, 100
Acetum, 99
Acids, Dilute, 9, 97, 110
Acids, Mineral, 94
Acids, Organic, 63, 105
Acidum Aceticum, 106
Acidum Arseniosum, 150
Acidum Benzoicum, 63
Acidum Boricum, 95
Acidum Carbolicum, 106
Acidum Carbolicum Liquefactum, 107
Acidum Chromicum, 95
Acidum Citricum, 108
Acidum Gallicum, 108
Acidum Hydrobromicum Dil., 96
Acidum Hydrochloricum, 95
Acidum Hydrocyanicum Dil., 109
Acidum Lacticum, 109
Acidum Meconicum, 63, 75
Acidum Nitricum, 95
Acidum Nitrohydrochloricum Dil., 96
Acidum Oleicum, 110, 112
Acidum Phosphoricum, 95
Acidum Salicylicum, 107
Acidum Sulphuricum, 94
Acidum Sulphurosum, 94
Acidum Tannicum, 108
Acidum Tartaricum, 108
Aconiti Folia, 27, 74
Aconiti Radix, 30, 74
Aconitina, 27, 30, 64, 69, 74
Active Principles of Definite Composition, 61</p> | <p>Adeps, 14
Adeps Benzoatus, 11, 15
Æther, 99
Æther Aceticus, 100
Alcohol, 98
Alcohol Amylicum, 101
Alcohol Ethylicum, 99
Alkaloids, 64
Alkaloids, Extraction of, 69
Allspice, 36, 79
Allylic Sulphocyanide, 45
Almond Oil, 40, 43, 79
Almonds, 40, 79
Aloes, 56, 87
Aloin, 64, 87
Alumen, 154
Ammonia, 125
Ammoniacum, 54, 80
Ammoniated Mercury, 134
Ammoniated Tinctures, 6
Ammonium Compounds, 125
Amygdala, 40, 79
Amygdalin, 28, 40
Amyl Nitris, 102
Amylic Alcohol, 101
Amylum, 61, 87
Amyridaceæ, 77
Anacardiaceæ, 77
Anethi Fructus, 35, 80
Anethi Oleum, 46, 80
Anethol, 45
Angelic Aldehyde, 45
Angustura Bark, 25, 77
Animal Kingdom, Drugs furnished by, 14
Aniseed, 37, 80
Anisi Fructus, 37, 80</p> |
|--|---|

- Anisi Oleum, 47, 74, 80
 Anisi Stellati Fructus, 37, 74
 Anthemidis Flores, 22, 81
 Anthemidis Oleum, 47, 81
 Antimonial Compounds, 148
 Apomorphina, 59, 67, 75
 Aqua, 90
 Aqua Aurantii Floris, 22, 76
 Aquæ, 8
 Arabin, 53
 Argentum, 156
 Argol, 117
 Aristolochiaceæ, 84
 Armoracia, 30, 75
 Arnica, 30, 81
 Arsenical Compounds, 150
 Arsenious Acid, 150
 Artanthic Acid, 28
 Asafœtida, 54, 80
 Asclepiadaceæ, 82
 Asparagine, 27
 Atropaceæ, 83
 Atropina, 27, 30, 64, 69, 83
 Atropinæ Sulphas, 64, 83
 Attar of Roses, 22
 Aurantiaceæ, 76
 Aurantii Cortex, 35
 Aurantii Floris Aqua, 22, 76
 Aurantii Fructus, 35, 76

 Bael Fruit, 37, 76
 Balsams, 52
 Balsamum Peruvianum, 52, 78
 Balsamum Tolutanum, 52, 78
 Barks, 25
 Barley, Pearl, 41, 87
 Bearberry, 28, 82
 Bebeeru, 26, 84
 Beberina, 26, 65, 70, 84
 Bela, 37, 76
 Belladonnæ Folia, 27, 83
 Belladonnæ Radix, 30, 83
 Benzoic Acid, 52, 63, 82
 Benzoinum, 52, 82
 Berberine, 30
 Bhang, 21, 85
 Bismuth Compounds, 146
 Black Oxide of Manganese, 157
 Blisters, 17
 Bone-ash, 91, 137
 Bone-black, 90
 Borax, 122
 Boric Acid, 95
 Borneene, 32
 Botanical Synopsis, 74
 Brandy, 104
 Bread-crumb, 112
 Bromum (*Bromine*), 92
 Broom, 20, 78
 Brucine, 41
 Buchu (*Bucco*), 27, 77
 Buds, 23
 Bulb, 30
 Burgundy Pitch, 49, 86
 Burnett's Solution, 184
 Butyl-Chloral Hydras, 101
 Byttneriaceæ, 76

 Cabbage Rose, 22, 79
 Caffeina, 65, 76
 Cajeput, Oil of, 47, 79
 Calabar Bean, 41, 78
 Calabarine, 41
 Calamina, 141
 Calcium Compounds, 137
 Calumba, 30, 74
 Calycifloræ, 77
 Calx, 138
 Calx Chlorinata, 138
 Calx Sulphurata, 138
 Cambogia, 54, 76
 Camphor, "Chinese" or "Peppermint," 45, 62
 Camphora, 62, 84
 Canada Balsam, 51, 86
 Canella Alba, 25, 76
 Canellaceæ, 76
 Cannabin, 21
 Cannabinaceæ, 85
 Cannabis Indica, 21, 85
 Cantharis, 16
 Caprifoliaceæ, 80
 Capsicum, 37, 83
 Capsules, 13
 Caraway, 36, 80
 Carbo Animalis, 90
 Carbo Ligni, 90
 Carbohydrates, 61
 Carbolic Acid, 106
 Cardamomum, 40, 87

- Carmine, 15
 Carui Fructus, 36, 80
 Carui Oleum, 46, 80
 Carvol, 45
 Caryophylli Oleum, 46, 79
 Caryophyllum, 23, 79
 Cascara Sagrada, 26, 77
 Cascarilla, 25, 84
 Cassia, 37, 78
 Castor Oil, 43, 85
 Cataplasmata, 12
 Catechu, 57, 81
 Cathartin, 28
 Cephaëlic Acid, 31
 Cera, 14
 Cerevisiæ Fermentum, 19, 88
 Cerii Oxalas, 157
 Cetaceum, 16
 Cetin, 16
 Cetraria, 19, 88
 Cevadilla, 39, 87
 Chalk, 137
 Chamomile, 22, 81
 Chamomile, Oil of, 47, 81
 Charcoal, Animal, 90
 Charcoal, Vegetable, 90
 Charta Epispastica, 12, 169
 Chartæ, 12, 169
 Cherry Laurel, 28, 79
 Chinese Camphor, 62, 83
 Chirata, 20, 82
 Chloral Hydras, 100
 Chlorodyne, 68
 Chloroforms, 13
 Chloroformum, 101
 Chlorum (*Chlorine*), 92
 Chromic Acid, 95
 Chrysarobinum, 58, 78
 Chrysophanic Acid, 31
 Cimicifuga, 30, 74
 Cinchona, 25, 81
 Cinchona Rubra, 25, 81
 Cinchonidina, 25, 65, 81
 Cinchonina, 25, 65, 81
 Cinnamic Acid, 52
 Cinnamic Aldehyde, 45
 Cinnamomi Cortex, 25, 84
 Cinnamomi Oleum, 46, 84
 Citric Acid, 108
 Cloves, 23, 79
 Cloves, Oil of, 46, 79
 Clysters, 11
 Coca, 27, 75
 Cocaina, 27, 65, 75
 Coccus (*Cochineal*), 16
 Cocoa-butter, 44, 76
 Cod-Liver Oil, 16
 Codeina, 59, 66, 75
 Colchici Cormus, 30, 87
 Colchici Semina, 40, 87
 Collodium, 7, 111
 Collodium Vesicans, 7, 17
 Collyria, 12
 Colocynthis, 38, 79
 Compositæ, 81
 Compound Preparations, Synopsis of, 158
 Concrete Juices, 56
 Confections, 9
 Coniferæ, 86
 Conii Folia, 27, 80
 Conii Fructus, 38, 80
 Conina, 27, 29, 38, 80
 Convolvulaceæ, 82
 Convolvulin, 49
 Copaiba, 51, 78
 Copaibæ Oleum, 47, 78
 Copaivic Acid, 51
 Copper Compounds, 157
 Coriandri Fructus, 36, 80
 Coriandri Oleum, 46, 80
 Corm, 30
 Corollifloræ, 80
 Cotton Wool, 42, 76
 Creasotum, 105
 Creta, 137
 Crocus, 22, 87
 Croton Oil, 43, 85
 Cruciferae, 75
 Cubeba, 38, 85
 Cubebæ Oleo-resina, 51, 85
 Cubebæ Oleum, 47, 85
 Cuca, 27, 75
 Cucurbitaceæ, 79
 Cuprum, 157
 Cupuliferæ, 85
 Curd Soap, 122
 Cuspariæ Cortex, 25, 77
 Cusso, 21, 79
 Cymene, 45

Dandelion, 32, 81
 Daturine, 41
 Deadly Nightshade, 27, 30, 83
 Decoctions, 6, 163
 Dicotyledones, 74
 "Digitaline," 28
 Digitalis Folia, 28, 83
 Dill, 35, 80
 Dill, Oil of, 46, 80
 Dilute Acids, 9
 Discs, 12, 13
 Discs, Ophthalmic, 12
 Dog-rose, 36, 79
 Dolomite, 152
 Dose, Proportion of, to Age, 183
 Doses, Synopsis of, 173

 Ecballii Fructus, 38, 80
 Egg, 14
 Elaterinum, 38, 64, 80
 Elaterium, 38, 58, 80
 Elder Flower, 22, 80
 Electuaries, 9, 159
 Elemi, 51, 77
 Embrocations (*see* "*Liniments*")
 Emetine, 31
 Emplastra, 12, 168
 Emplastrum Calefaciens, 17, 169
 Emulsin, 40
 Enemas, 11
 Epispastics, 12, 17
 Ergota, 19, 88
 Ergotinum, 5, 19
 Ericaceæ, 82
 Erythroxylaceæ, 75
 Eserine, 41, 66, 78
 Essences, 5
 Ether, 99
 Eucalypti Oleum (*Eucalyptol*), 47, 79
 Euodic Aldehyde, 45
 Euphorbiaceæ, 84
 Excrescence, 56
 Extracts, 4, 163
 Eye-washes, 12

 Farina Lini, 41, 75
 Farina Tritici, 40, 87
 Fel Bovinum, 16
 Fennel Fruit, 36, 80

Fern, 30, 88
 Ferrum, 128
 Ferrum Redactum, 131
 Ficus (*Fig*), 38, 85
 Filices, 88
 Filix Mas, 30, 88
 Fir-wood Oil, 47, 86
 Fixed Oils, 43
 Flax, 41, 75
 Flexile Collodion, 7
 Flour, 40, 87
 Flowering Tops, 21
 Flowers, 22
 Fœniculi Fructus, 36, 80
 Frangulin, 26
 Frankincense, 51, 86
 Fruits, 35
 Fungi, 19, 88
 Fusel Oil, 101

 Galbanum, 54, 80
 Galla (*Galls*), 57, 85
 Gallic Acid, 108
 Gamboge, 54, 76
 Gargarismata, 12
 Gargles, 12
 Gelsemium, 31, 82
 Gentiana, 31, 82
 Gentianaceæ, 82
 Gentio-picrin, 31
 Ginger, 33, 87
 Glacial Acetic Acid, 106
 Glands from Fruit, 35
 Glucosides, 63
 Glycerines, 8
 Glycerinum, 111
 Glycyrrhiza, 31, 78
 Goa-powder, 58, 78
 Gossypium, 42, 76
 Graminaceæ, 87
 Granati Radicis Cortex, 26, 79
 Granulated Sulphate of Iron, 128
 Granulated Zinc, 140
 Green Tops, 20
 Guaiaci Lignum, 24, 77
 Guaiaci Resina, 49, 77
 Gum Arabic, 53, 78
 Gum Tragacanth, 53, 78
 Gum-resins, 54
 Gums, 53

- Gun-Cotton, 111
 Gunjah, 21, 85
 Gutta Percha, 58, 82
 Guttiferæ, 76
 Gymnospermia, 86
- Hæmatoxyli Lignum, 24, 78
 Hashish, 21, 85
 Hellebore, 33, 87
 Hemidesmus, 31, 82
 Hemlock Fruit, 38, 80
 Hemlock Leaves, 27, 80
 Hemp, 21, 85
 Henbane, 28, 83
 Hips, 36, 79
 Hirudo, 15
 Hoffmann's Anodyne, 100
 Honey, 9, 14
 Hop, 21, 85
 Hordeum Decorticatum, 40, 87
 Horse-radish, 30, 75
 Hydrargyrum, 133
 Hydrargyrum cum Cretâ, 135
 Hydrobromic Acid, 96
 Hydrochloric Acid, 95
 Hydrocyanic Acid, 8, 28, 40, 109
 Hygrine, 27
 Hyoscyami Folia, 28, 83
 Hypodermic Injections, 11
- Iceland Moss, 19, 88
 Igasuric Acid, 41
 Incompatibility, 192
 Indian Hemp, 21, 85
 Indian Sarsaparilla, 31, 82
 Indian Tobacco, 20, 82
 Infusions, 6, 163
 Inhalations, 10
 Injections (Hypodermic), 11
 Iodoformum, 101
 Iodum (*Iodine*), 93
 Ipecacuanha, 31, 81
 Iridaceæ, 87
 Iron Compounds, 128
- Jaborandi, 28, 77
 Jalapa, 31, 82
 Jalapæ Resina, 49, 83
 Jervine, 33
- Juices, 5
 Juniperi Oleum, 47, 86
- Kamala, 38, 85
 Kelp, 93
 Kino, 57, 78
 Koussou, 21, 79
 Krameria, 31, 75
- Labiataæ, 83
 Lac, 14
 Lactic Acid, 109
 Lactuca, 20, 81
 Lamels, 13
 Lard, 14
 Larix (*Larch*), 26, 86
 Latin Phrases, 172
 Lauraceæ, 84
 Lauro-cerasi Folia, 28, 79
 Lavandulæ (*Lavender*) Oleum, 46, 83
 Lead Compounds, 143
 Leaves, 27
 Leeches, 15
 Leguminosæ, 78
 Lemon, 36, 76
 Lemon, Oil of, 46, 76
 Lettuce, 20, 81
 Lichens, 19, 88
 Lignum Vitæ, 24, 77
 Liliaceæ, 87
 Lime, 138
 Limonis Cortex, Succus, 36, 76
 Limonis Oleum, 46, 76
 Linaceæ, 75
 Linctuses, 13
 Lini Farina, 41, 75
 Lini Oleum, 43, 75
 Lini Semina, 41, 75
 Liniments, 11, 166
 Linseed, 41, 75
 Linseed Meal, 41, 75
 Linseed Oil, 43, 75
 Liquidambaraceæ, 86
 Liquor Epispasticus, 7, 17
 Liquores, 7, 165
 Liquorice, 31, 78
 Litharge, 143
 Lithium Compounds, 155
 Lobelia, 20, 82
 Lobeliaceæ, 82

- Loganiaceæ, 82
 Logwood, 24, 78
 Lotions, 11, 134
 Lozenges, 10, 165
 Lupulinum, 21, 38, 85
 Lupulus, 21, 85

 Mace, 41
 Magnesium Compounds, 152
 Magnoliaceæ, 74
 Male Fern, 30, 88
 Malvaceæ, 76
 Manganesii Oxidum Nigrum, 157
 Manna, 58, 82
 Margarin, 44
 Marmor Album (*Marble*), 138
 Mastiche, 49, 77
 Maticæ Folia, 28, 85
 Meconic Acid, 39, 63, 75
 Meconin, 59
 Medicinal Uses of the Pharmacopœial Drugs, 193
 Mel, 9, 14
 Melanthaceæ, 87
 Menispermaceæ, 74
 Menthæ Piperitæ Oleum, 46, 83
 Menthæ Viridis Oleum, 46, 83
 Menthol, 45, 62, 83
 Mercurial Compounds, 133
 Metarabin, 53
 Methyl-Conine, 38
 Mezerei Cortex, 26, 84
 Mica Panis, 112
 Milk, 14
 Milk Sugar, 17
 Mineral Acids, 94
 Minerals and Manufactured Products, 89
 Mixtures, 10
 Monochlamydeæ, 84
 Monocotyledones, 86
 Moraceæ, 85
 Mori Succus, 36, 85
 Morphina, 59, 66, 71, 75
 Moschus, 16
 Mucilages, 8
 Mulberry, 36, 85
 Musk, 16
 Musk Root, 32, 80
 Mustard, 41, 75
 Mustard, Oil of, 48, 75
 Myristic Acid, 43
 Myristica, 41, 84
 Myristicaceæ, 84
 Myristicæ Oleum, 46, 84
 Myristicæ Oleum Expressum, 43, 84
 Myristicol, 45
 Myronic Acid, 41
 Myrosin, 41
 Myrrha, 54, 77
 Myrtaceæ, 79

 Nectandræ Cortex, 26, 84
 Nectandrine, 65
 Neutral Principles, 64
 Nicotine, 26
 Nitre, 114
 Nitric Acid, 95
 Nitrite of Amyl, 102
 Nitroglycerin, 112
 Nitro-hydrochloric Acid, Dilute, 96
 Nitrous Ether, 100
 Nitrous Oxide, 127
 Nutmeg, 41, 84
 Nutmeg, Oil of, 46, 84
 Nutmeg-butter, 43, 84
 Nux Vomica, 41, 82

 Oak Bark, 26, 85
 Oil of Bitter Almonds, 40
 Oil of Male Fern, 30
 Oil of Winter Green, 107
 Oils, 9
 Oils, Fixed, 43
 Oils, Volatile, 45
 Ointments, 11, 167
 Oleaceæ, 82
 Oleates, 9
 Oleo-resina Cubebæ, 51, 85
 Oleo-resins, 51
 Oleum Amygdalæ, 43, 79
 Oleum Anethi, 46, 80
 Oleum Anisi, 47, 80
 Oleum Anthemidis, 47, 81
 Oleum Cajuputi, 47, 79
 Oleum Carui, 46, 80
 Oleum Caryophylli, 46, 79
 Oleum Cinnamomi, 46, 84
 Oleum Copaihiæ, 47, 78
 Oleum Coriandri, 46, 80

Oleum Crotonis, 43, 85
 Oleum Cubebæ, 47, 85
 Oleum Eucalypti, 47, 79
 Oleum Juniperi, 47, 86
 Oleum Lavandulæ, 46, 83
 Oleum Limonis, 46, 76
 Oleum Lini, 43, 75
 Oleum Menthæ Piperitæ, 46, 83
 Oleum Menthæ Viridis, 46, 83
 Oleum Morrhuæ, 16
 Oleum Myristicæ, 46, 84
 Oleum Myristicæ Expressum, 43, 84
 Oleum Olivæ, 43, 82
 Oleum Phosphoratum, 9
 Oleum Pimentæ, 46, 79
 Oleum Pini Sylvestris, 47, 86
 Oleum Ricini, 43, 85
 Oleum Rosmarini, 46, 83
 Oleum Rutæ, 48, 77
 Oleum Sabinæ, 48, 86
 Oleum Santali, 48, 84
 Oleum Sinapis, 41, 48, 75
 Oleum Terebinthinæ, 48, 86
 Oleum Theobromatis, 44, 76
 Olivæ Oleum, 43, 82
 Opium, 38, 59, 75
 Orange, 35, 76
 Orange Flower Water, 22, 76
 Orange Wine, 104
 Os Ustum, 91, 137
 Ovi Albumen, 14
 Ovi Vitellus, 14
 Oxgall, 16
 Oxymel, 9, 15

Palmaceæ, 82
 Papaveraceæ, 75
 Papaveris Capsulæ, 38, 75
 Papers, 12, 169
 Paraffinum Durum, 112
 Paraffinum Molle, 112
 Pareira, 31, 74
 Pearl Barley, 40, 87
 Pellitory, 31, 81
 Pelosine, 31
 Pepper, 39, 85
 Peppermint, Oil of, 46, 83
 Peppermint camphor, 45, 62
 Peppsin, 16
 Peruvian Balsam, 52, 78

Pessaries, 13
 Phaoretin, 31
 Pharmacopœia, The, 1
 Phenol, 106
 Phosphoric Acid, 95
 Phosphorus, 91
 Phrases used in Prescribing, 172
 Physostigmina, 41, 66, 78
 Physostigma, 41, 78
 Pill-Masses, 10, 160
 Pilocarpina, 28, 66, 77
 Pimaric Acid, 59
 Pimenta, 36, 79
 Pimentæ Oleum, 46, 79
 Pini Sylvestris Oleum, 47, 86
 Pinic Acid, 50
 Piper, 39, 85
 Piperaceæ, 85
 Pix Burgundica, 49, 86.
 Pix Liquida (*Pitch*), 105
 Plants Entire, 20
 Plasters, 12, 168
 Plumbum, 143
 Podophylli Rhizoma, 31, 74
 Podophylli Resina, 50, 74
 Polycroite, 22
 Polygalaceæ, 75
 Polygalic Acid, 32
 Polygonaceæ, 84
 Pomegranate, 26, 79
 Poppy Capsules, 38, 75
 Popular Designations, 170
 Posological Tables, 173
 Potassium Compounds, 114
 Poultices, 12
 Powders, Compound, 9, 158
 Preparations, the Pharmacopœial, 4
 Preparations, Synopsis of Compound, 158
 Prescribing, Latin Phrases used in, 172
 Proof Spirit, 99
 Proportion of active ingredients in the Pharmacopœial Preparations, 184
 Proportion of Dose to Age, 183
 Prunum, 39, 79
 Prussic Acid, 8, 28, 40, 109
 Pterocarpi Lignum, 24, 78
 Pulveres Compositæ, 9, 158
 Pyrethrum, 31, 81
 Pyroxylin, 111

- Quassia, 24, 77
 Quercus, 26, 85
 Quinic, Quinovic, and Quino-tannic
 Acids, 25
 Quinidin, 25
 Quinina, 25, 66, 67, 81

 Raisins, 36, 76
 Ranunculaceæ, 74
 Rectified Spirit, 98
 Red Poppy, 22, 75
 Remijia, 25, 81
 Resina, 50, 86
 Resins, 49
 Rhamnaceæ, 77
 Rhamnus Frangula, 26, 77
 Rhamnus Purshianus, 26, 77
 Rhatany, 31
 Rheotannic Acid, 31
 Rheum, 31, 84,
 Rhœados Petala, 22, 75
 Rhubarb, 31, 84
 Ricini Oleum, 43, 85
 Roots and Rhizomes, 30
 Rosa Canina (*Hips*), 36, 79
 Rosa Centifolia (*Cabbage Rose*), 22, 79
 Rosa Gallica (*Red Rose*), 22, 79
 Rosaceæ, 79
 Rosin, 50, 86
 Rosmarini (*Rosemary*) Oleum, 46, 83
 Rottlerin, 38
 Rubiaceæ, 81
 Rue, Oil of, 48, 77
 Rutaceæ, 77
 Rutæ Oleum, 48, 77

 Sabadilla, 39, 87
 Sabinæ Cacumina, 20, 86
 Sabinæ Oleum, 48, 86
 Saccharum Lactis, 17
 Saccharum Purificatum, 61, 88
 Saffron, 22, 87
 Salicaceæ, 86
 Salicinum, 63, 86
 Salicylic Acid, 107
 Salicylol, 63
 Saligenol, 63
 Saltpetre, 114
 Sambuci Flores, 22, 80
 Sandal-wood, Red, 24, 78
 Sandal-wood, Oil of, 48, 84
 Santalaceæ, 84
 Santali Oleum, 48, 84
 Santalin, 24
 Santonate, Sodium, 64
 Santonica, 23, 81
 Santoninum, 23, 64, 73, 81
 Sapo Animalis, 122
 Sapo Durus, 122
 Sapo Mollis, 116
 Sapotaceæ, 82
 Sarsæ Radix (*Sarsaparilla*), 32, 86
 Sassafras, 32, 84
 Savin, Oil of, 48, 86
 Savin Tops, 20, 86
 Scammonia Radix, 32, 83
 Scammonia Resina, 50, 83
 Scammonium, 54, 83
 Scilla, 32, 87
 Scoparii Cacumina, 20, 78
 Scrophulariaceæ, 83
 Seeds, 40
 Senega, 32, 75
 Senna, 28, 78
 Serpentaria, 32, 84
 Sevum, 14
 Sherry, 104
 Silver Compounds, 156
 Simarubaceæ, 77
 Sinalbin, 41
 Sinapis, 41, 75
 Sinapis Oleum, 41, 48
 Smilaceæ, 86
 Smilacin, 32
 Soap, Animal or Curd, 122
 Soap, Castile or Hard, 122
 Soap, Soft, 116
 Sodium Compounds, 119
 Solanaceæ, 83
 Solutions, 7, 165
 Spanish Fly, 16
 Sparteine, 20
 Spearmint, Oil of, 46, 83
 Spermaceti, 16
 Spiræa Ulmaria, Oil of, 63
 Spirits, 6, 98, 164
 Spiritus Ætheris Nitrosi, 100
 Spiritus Ammonia Fœtidus, 55
 Spiritus Rectificatus, Tenuior, 98, 99
 Spiritus Vini Gallici, 104

- Squill, 32, 87
 Squirting Cucumber, 38, 80
 Staphisagria, 41, 74
 Star Anise, 37, 74
 Starch, 61, 87
 Stavesacre, 41, 74
 Stearoptenes, 62
 Sterculiaceæ, 76
 Storax, 52, 86
 Stramonii Semina, 41, 83
 Strobile, 21
 Strychnina, 41, 67, 72, 82
 Styracaceæ, 82
 Styracin, 52
 Styraç, 52, 86
 Styrol, 52
 Subcutaneous Injections, 11
 Succî, 5
 Suet, 14
 Sugar, Loaf, 61, 88
 Sugar, Milk, 17
 Sulphur, 91
 Sulphuric Acid, 94
 Sulphuris Iodidum, 91
 Sulphurous Acid, 94
 Sumbul, 32, 80
 Suppositories, 11
 Suppositories, Urethral, 13
 Sylvic Acid, 50
 Symbols, 13
 Synopsis, Botanical, 74
 Synopsis of Compound Preparations, 158
 Synopsis of Doses, 173
 Synopsis of Proportions of Active Ingredients, 184
 Syrups, 8, 165
 Syrupus, 8, 62

 Tabaci Folia, 28, 83
 Tabellæ, 10, 13
 Table of Doses, 173
 Table of Latin Phrases used in Prescribing, 172
 Table of Opium Preparations, 60
 Table of Popular Designations, 170
 Table of Proportion of Active Ingredients in the Pharmacopœial Preparations, 184
 Tablets, 10, 13

 Tamarindus, 39, 78
 Tannic Acid, 108
 Tar, Wood, 105
 Tar, Coal, 106
 Taraxacum, 32, 81
 Tartar Emetic, 149
 Tartaric Acid, 108
 Terebinthina Canadensis, 51, 86
 Terebinthinæ Oleum, 48, 86
 Terpenes, 45
 Thalamifloræ, 74
 Thebaine, 59
 Thebolactic Acid, 59
 Theobromatis Oleum, 44, 76
 Theriaca, 61, 112
 Thus Americanum, 51, 86
 Thymelaceæ, 84
 Thymol, 62, 80, 84
 Tinctures, 6, 163
 Tobacco, 28, 83
 Tolu, 52, 78
 Tops, 20, 21
 Tragacantha, 53, 78
 Treacle, 61, 112
 Tritici Farina, 40, 87
 Trochisci, 10, 165
 Tubers, 30
 Turpentine, Oil of, 48, 86
 Twigs, 20

 Umbelliferæ, 80
 Unguenta, 11, 167
 Unguentum Simplex, 11, 15, 167
 Uvæ, 36, 76
 Uvæ Ursæ Folia, 28, 82

 Valeriana, 32, 81
 Valerianaceæ, 81
 Valeric (or Valerianic) Acid, 32, 122
 Valerol, 32
 Vapores, 10
 Vaseline, 112
 Vegetable Kingdom, officinal drugs furnished by the, 18
 Veratri Viridis Radix, 33, 87
 Veratrina, 39, 67, 72, 87
 Veratroidine, 30, 33
 Vina, 6, 104, 165
 Vinegar, 99
 Vinegars, 7

Vinum Aurantii, 104
 Vinum Xericum, 104
 Vitaceæ, 76
 Volatile Oils, 45

Water, 90
 Waters, 8
 Wax, 14
 Weights and Measures, 13
 Wheat Flour, 40, 87
 Wines, 6, 104, 165
 Wood Ashes, 114

Wood Tar, 105
 Woods, 24
 Worm Seed, 23, 81
 Wurrus, 38, 85

Yeast, 19, 88

Zinc Compounds, 140
 Zingiber, 33, 87
 Zingiberaceæ, 87
 Zygophyllaceæ, 77

INDEX TO THE CHAPTER ON THE MEDICINAL USES OF THE PHARMACOPŒIAL DRUGS.

Acetic Acid, 194
 Acetic Ether, 196
 Acid, Acetic, 194
 Acid, Arsenious, 202
 Acid, Benzoic, 206
 Acid, Carbohc, 196
 Acid, Chrysophanic, 212
 Acid, Citric, 197
 Acid, Gallic, 197
 Acid, Hydrocyanic, 197
 Acid, Lactic, 197
 Acid, Salicylic, 197
 Acid, Tannic, 197
 Acid, Tartaric, 197
 Acids, Mineral, 194
 Aconite and Aconitine, 212
 Alcohol, 196
 Aloes, 208
 Alum, 203
 Ammonia and Ammonium Salts, 199
 Ammoniacum, 205, 206
 Amyl Nitrite, 196
 Aniseed and Oil of Anise, 211
 Anthelmintics, 207
 Antimonial Compounds, 202
 Antiseptics, 204
 Apomorphine, 215
 Arnica, 210

Arsenical Compounds, 202
 Asafœtida, 208
 Astringents, Inorganic, 204
 Astringents, Organic, 207
 Atropine, 213
 Bael-fruit, 207
 Bearberry, 207
 Berberine, 207
 Belladonna, 213
 Benzoic Acid, 206
 Benzoin, 206
 Bismuth, 202
 Bitter Tonics, 207
 Black Wash, 200
 Blue-pill, 201
 Borax, 199
 Bromine, and Bromides, 194
 Broom, 209
 Brucine, 215
 Buchu, 206
 Burgundy Pitch, 205
 Butyl-chloral, 196
 Caffeine, 213
 Cajeput, Oil of, 206
 Calcium Compounds, 201
 Calomel, 201

Calumba, 207
 Camphor, 206, 212
 Cantharides, 206
 Capsicum, 206, 207
 Caraway, 207
 Carbolie Acid, 196
 Cardamoms, 207
 Carminatives, 207
 Carron Oil, 201
 Cascara Sagrada, 208
 Cascarilla, 207
 Cassia, 208
 Castor Oil, 208
 Catechu, 207
 Caustics and Destructives, 204
 Cerium, 204
 Chalk, 201
 Chamomile, 207, 208
 Charcoal, 193
 Chiretta, 207
 Chloral Hydrate, 196
 Chlorides, 194
 Chlorinated Lime and Soda, 194
 Chlorine, 193
 Chloroform, 195
 Chrysophanic Acid, 212
 Cimicifuga, 210
 Cinchona and its Alkaloids, 207, 214
 Cinnamon, 207
 Citric Acid, 197
 Clove, 207
 Cocaine, 213
 Codeine, 214
 Cod-liver Oil, 209
 Colchicum, 211
 Collodion, 197
 Colocynth, 208
 Conium and Conine, 209
 Copaiba, 206
 Copper Compounds, 204
 Coriander, 207
 Corrosive Sublimate, 200
 Creasote, 197
 Croton Oil, 206, 208
 Cubebs, 206
 Cusparia, 207

 Digitalis, 210
 Dill, 207

Disinfectants, 204
 Donovan's Solution, 203

 Elaterium and Elaterin, 208
 Elemi, 205
 Emetics, inorganic, 205
 Ergot, 209
 Ether, 195
 Eucalyptol, 212

 Figs, 208
 Fir-wood Oil, 206
 Frankincense, 205

 Galbanum, 205
 Gallic Acid, 197
 Galls, 207
 Gamboge, 208
 Gelsemium, 211
 Gentian, 207
 Ginger, 207
 Goa Powder, 212
 Guaiacum, 211, 212

 Henbane, 210
 Hop, 207
 Horse-radish, 206
 Hydrocyanic Acid, 197
 Hypophosphites, 193

 Iceland Moss, 209
 Indian Hemp, 209
 Iodine and Iodides, 194
 Iodoform, 196
 Ipecacuanha, 211
 Iron, 200
 Irritants, 205

 Jaborandi, 215
 Jalap, 208
 Juniper, Oil of, 212

 Kino, 207
 Kousso, 207

 Lactic Acid, 197
 Lavender, 207
 Larch, 207
 Lead Compounds, 202
 Lemon, 207

Lettuce, 209
 Lime, 201
 Lithium Compounds, 199
 Lobelia, 209
 Logwood, 207

Magnesium Compounds, 203
 Male-fern, Oil of, 207
 Manna, 208
 Matico, 210
 Menthol, 212
 Mercury and its Compounds, 200
 Mezereon, 211
 Mineral Acids, 194
 Morphine, 214
 Musk, 208
 Mustard, 206
 Mustard, Oil of, 206
 Myrrh, 212

Nitroglycerine, 197
 Nitrous Ether, 196
 Nutmeg, 207
 Nutmeg-butter, 205
 Nux Vomica, 207

Oak-bark, 207
 Opium, 214
 Orange, 207
 Organic Drugs, 205
 Ox-gall, 209

Parasiticides, 207
 Pareira, 206
 Pellitory, 207
 Pepper, 207
 Peppermint, 207
 Pepsin, 209
 Peruvian Balsam, 206
 Phosphorus and Phosphates, 193
 Physostigma and Physostigmine, 215
 Pilocarpin, 215
 Pimento, 207
 Pix Liquida, 196
 Podophyllin, 208
 Pomegranate, 207

Poppy, 211
 Potassium Compounds, 198
 Prunes, 208
 Purgatives, Inorganic, 205
 Purgatives, Organic, 208

Quassia, 207
 Quinine, 214

Red-rose, 207
 Rhamnus Frangula, 208
 Rhatany, 207
 Rhubarb, 208
 Rosin, 205
 Rubefacients, 205
 Rue, 208

Salicin, 207, 212
 Salicylic Acid and Salicylates, 197
 Sandal-wood, Oil of, 206
 Santonin, 207
 Sarsaparilla, 211
 Sassafras, 211
 Savin, 206
 Scammony, 207, 208
 Senega, 211
 Senna, 208
 Silver Compounds, 203
 Sodium Compounds, 198
 Spearmint, 207
 Spermaceti, 209
 Spiritus Ætheris Co., 196
 Squill, 211
 Stavesacre, 207
 Stimulants, 205
 "Stimulating Expectorants," 206
 Storax, 206
 Stramony, 211
 Strychnine, 207, 215
 Sulphides, 193
 Sulphites, 195
 Sulpho-carbolates, 197
 Sulphur, 193
 Sulphuretted Lime and Potash, 193
 Sumbul, 208

Tamarinds, 208
Tannic Acid, 197
Taraxacum, 208
Tartar Emetic, 202
Tartaric Acid, 197
Thymol, 212
Tobacco, 210
Tolu, 206
Tonics, 207
Turpentine, Oil of, 206, 207, 212

Valerian and Valerianates, 208
Veratrine, 206, 215

Veratrum Viride, 211
Vesicants, 205
Vinegar, 195

White Precipitate, 200
Wurris, 207

Yeast, 209
Yellow Wash, 200

Zinc Compounds, 201



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